

THIS WEEK IN THE IRON AGE

Vol. 158, No. 6

August 8, 1946

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Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, \$8; Foreign, \$15 per year. Single Copy, 35 cents. Annual Review Number, \$2.00.

Cable Address, "Ironage" N. Y.

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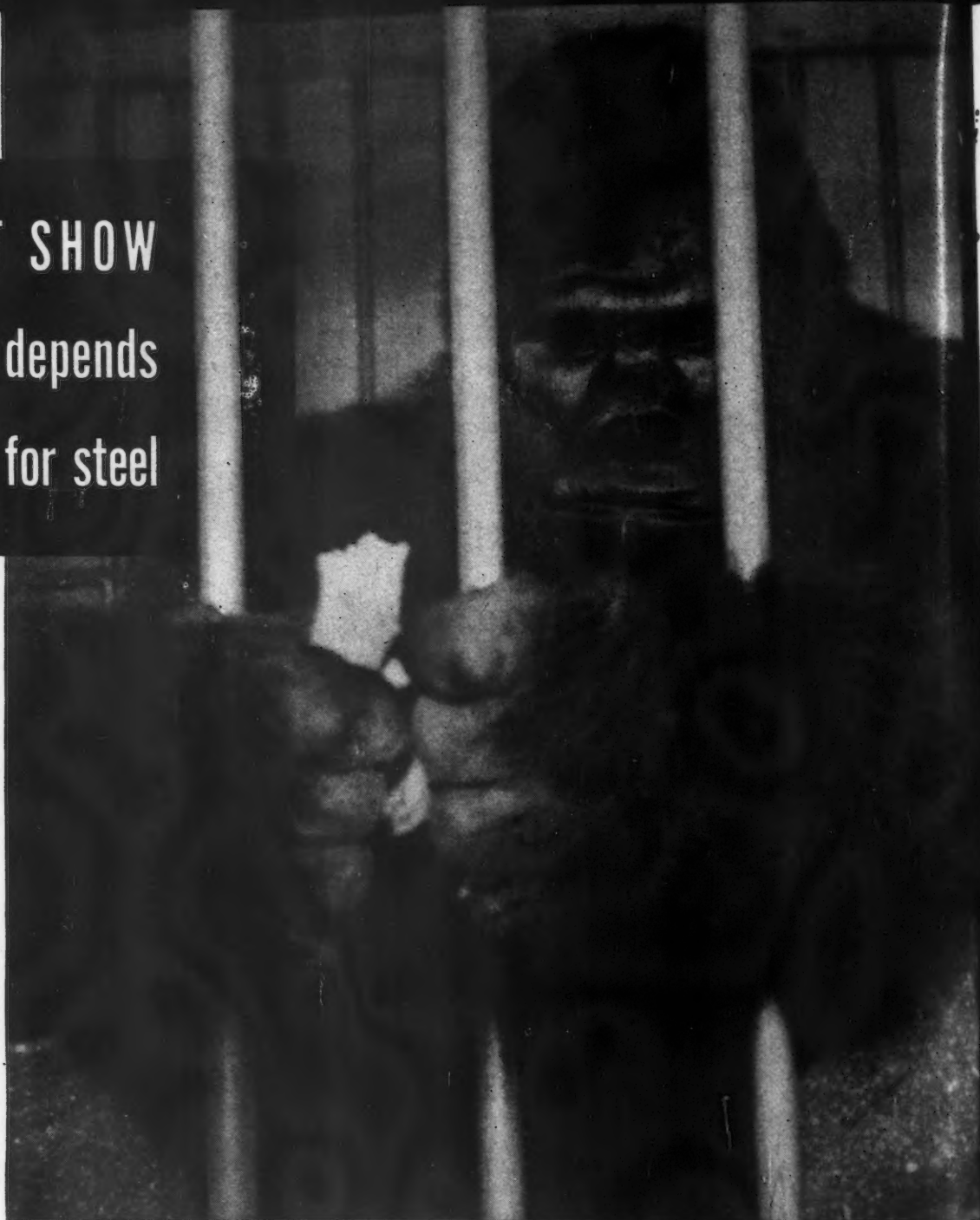
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The Flying Horse

EVEN though Socony-Vacuum seems to have copyrighted the flying horse, I am venturing to use him in an editorial. I believe that THE IRON AGE is safe from suit, since flying horses have been known since the days of mythology, starting with Pegasus.

Pegasus, as all of you engineers undoubtedly learned in Mechanics II, was the prototype of the airplane. But he was differently constructed. This original flying horse sprang from the blood of Medusa, when her head was cut off by Perseus.

Even in those early days, a flying horse would have been of considerable value compared with the grounded variety. It would be able to carry people farther and much faster and perhaps more comfortably than the earthbound nags who now amble over our highways dodging the motor vehicles.

There is some doubt and mystification as to the ultimate fate of Pegasus, but recent researches have cleared that up and I am now in position to tell the true story. Pegasus' wings were clipped, a little bit at a time, by the earthbound equines who thought that things should be evened up and that this was the only way to do it.

American industry has had its managerial Pegasus, who carried us fast and far before its wings were clipped. There is no doubt in the world that some men have exceptional qualities, as different from the usual run of mankind as Pegasus differed from the wingless horse. Because of them, and I might mention people like Henry Ford, Alfred P. Sloan, Jr., Eugene Grace and a thousand others, America was given an economic lift to a position far above that of any other nation.

These men are natural managers and they have vision and abilities beyond those of the rest of us plodders who, however, have benefited from their exceptional qualities. They did their job for us because when they did it, their wings were not clipped.

But management's wings have been clipped and to such extent that our national economic pace has been sadly slackened and we can no longer hope to soar to new heights of accomplishment unless we permit its wings to grow again.

In the days when the managerial Pegasus possessed its wings, it had the power to hire those who in its judgment possessed the requisite ability; it could discharge and discipline for cause; it could adjust wages when required; it could specify the number of working hours per week, and it could, in other words, manage.

All of these wing feathers have now been clipped, and in addition the threat looms that pricing policies may be taken from it.

It is true that these privileges, or perhaps rights of management, from time to time have been abused to the detriment of those earthbound horses who have helped to pull the load. But by and large, the freedom to exercise this power to fly made America what it is today. Grounding our flying horses may turn out to be a mistake for all of us.

J. H. Van Deventer

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At least three steelmakers are investigating use of oxygen in blast furnaces and openhearths. Compared to current oxygen consumption in the steel plant the volume involved is enormous.

A theory about blast furnace operation now gaining wider acceptance is that the major limit on furnace capacity is the physical limitation of getting raw materials in the top. At least one company is considering substituting conveyor belts for the conventional skip hoist.

The most striking change planned for 1948 motor cars is a revolutionary type of front end suspension said to give greatly increased riding comfort, a substantial increase in dead weight and fingertip steering even at high speeds. All major producers are reported to be working on this development.

Extensive research effort is being carried on by builders of heavy duty trucks and buses to develop heat and corrosion resistant alloys for mufflers and tail pipes.

Labor shortages are looming larger in the Chicago area with one steelmaker reporting inability to fill a demand for 500 laborers. Mill delays are resulting from the shortage. In the neighboring state of Indiana there are 42,000 veterans receiving employment compensation.

American strength in the air during the coming year will amount to 21,614 planes. Of these, 19 will be jet bombers and 1119 jet fighters. The remainder are airplanes of the latest types which were contracted for prior to the end of the war. While there is no shortage of aircraft, it is doubtful that sufficient personnel will be available to maintain anywhere near the above number.

Army Ordnance is reconverting all of its tanks back to rubber tracks. Steel tracks are impractical for training purposes and cannot be used on the highways. The rubber tracks range in cost from \$2000 to \$6800.

In successfully demonstrating the technical and commercial feasibility of electro-synthesis in beneficiating low-grade manganese ore, the Bureau of Mines produced more than million pounds of manganese metal in the first 3 yr of the operation of a pilot plant at Boulder City, Nev.

An eastern utility is reviewing its wrought iron pipe costs and experience in the nineteenth century to compare initial cost and maintenance with steel pipe in current use.

GE engineers have developed a simple fatigue testing machine which operates on the principle of the slide trombone.

Porcelain enamel coatings in various colors on aluminum are being considered for table tops, trays, bicycle frames and bathroom fixtures. The application is not well suited for use on heat treated alloys because the high baking temperatures affect the strength of the metal.

Closer study of the operations of the blast furnaces at the Herman Goering Steel Works which had reputedly produced a high yield at relatively low cost reveals a gross error in the original investigation. It has since been found that the blast furnaces were charged with from 30 to 50 pct iron and steel scrap.

Investigations in Germany reveal the development of a method of simultaneously welding and forming thin-walled aluminum parts. This process of pressure welding of aluminum is carried out with the material in the plastic condition using high pressure and leaves no cast structure behind.

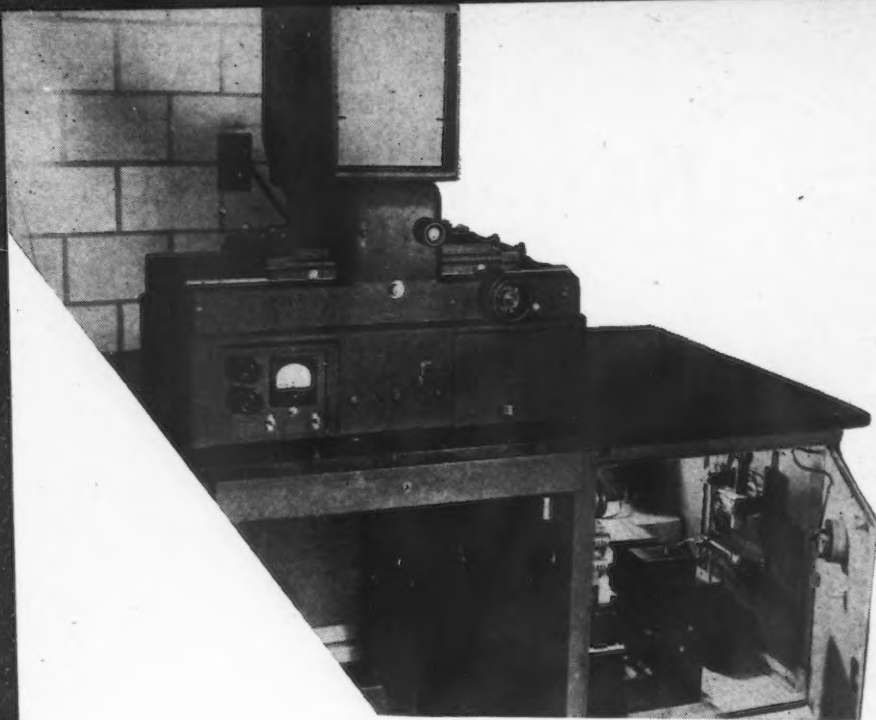
The whole operation takes about 30 sec and is particularly suitable for large quantity production.

The modernization program of the British steel industry may push ingot production to the point where it will have to import considerable scrap. The east coast of the United States would be the logical supply source for British scrap buyers. There may be a revival of the prewar International Scrap Convention.

Members of the Egyptian government's hydroelectric power commission yesterday began an inspection tour of United States and Canadian hydroelectric installations. They will also consult American equipment manufacturers in their preparations for a 40 million project at the Aswan dam on the Nile.

At least one exporter reported difficulty in placing a CXS rated order with a number of steel mills. CPA says that the remedy in cases like this is for the exporter to take his case, fully documented, to CPA in Washington where they will issue a directive on a specific mill if the facts warrant.

Government surplus sales agencies reached a new high in imaginative publicity with the WAA announcement that it had Liberator fuselages for sale and suggested they be used for hot dog stands. WAA also moved 312 arm slings in a few hours by advertising them as diapers. The Navy is offering carriers and submarines for sale; end use is not suggested though they need not be sold for scrap.



• General view of modified microdensitometer.

By LOUIS E. OWEN
Chief Spectrographer,
Reynolds Metals Co.,
Louisville, Ky.

• • •

THE war-fostered expansion of the aluminum industry created an unprecedented analytical load which was handled by the extension and improvement of instrumental methods. At the Reynolds Metals Co., spectrographic methods were instituted to remove the major burden of routine control analyses from the personnel of its chemical departments. Use of spectrography not only made it possible

The author, Mr. L. E. Owen, is now associated with the New York State Research Institute, Saratoga Springs, N. Y. When this article was prepared he was chief spectrographer at Reynolds.

to handle the great number of determinations but also made possible the utilization of technicians with little previous technical training. The economy of spectrography also has been an appreciable factor, as all determinations made by this method have a uniform low cost, while wet chemical determinations vary greatly in individual expense with all at a much higher figure.

The spectrographic analysis of aluminum alloys, with equipment in general use, involves the preparation of samples, their excitation by a high-voltage spark, the photographing of the spectra dispersed by the spectrograph, the processing of the photographic material, the reading of the films or plates on a microdensitometer and the calculation and clerical handling of the analytical results. The relative simplicity of the spectra of aluminum alloys, with a consequent narrow choice of comparison lines, has resulted in close agreement on general techniques of aluminum spectrographic analysis throughout the entire industry. Not so well known or standardized, however, are the modifications of commercial spectrographic equipment

High Speed Spectrography

A detailed description of modifications made to commercial spectrographic equipment in order to adapt it for high-speed routine control analyses is presented herein. In this, the first part of a two-part article, the author discusses changes made to the safety hood, the spark source unit and the spectrograph camera.

which organizations such as Reynolds have adapted for their routine high-speed control laboratories.

Commercial assemblies of spectrographic equipment are, in general, of very high quality in workmanship and materials. They are necessarily, however, designed to be very versatile, so that they will be useful in many types of industry employing widely variant techniques. This is desirable when the units are installed in research laboratories. It is not necessarily desirable when equipment is to be utilized for routine laboratories having rigidly standardized procedures and requiring unskilled labor to handle a large volume of work. The nature of the work load, the techniques employed, and the use of unskilled women employees have been factors at the Reynolds laboratories leading to the adoption of several specific modifications of the purchased spectrographic equipment. Other laboratories, operating under other conditions, may find some of these changes useful to them and may require others not found necessary or economical for the installations described.

The modifications are primarily to the spectrograph proper with its spark excitation unit and the microdensitometer together with its accessories designed for automatic control or simplified operation. The spectrograph has been enclosed in a hood called the safety hood, which also encloses the major components of the spark source which has been redesigned in order to eliminate several manual controls. The densitometer has been changed by the addition of motor drive to the plate carriage, the incorporation of solenoid operation for the slit head assembly, and the extensive relocation of its electrical components together with additional voltage regulation and exten-

sive automatic control. Among the special accessories to be explained are a carbon electrode releasing device, automatic safety window release, automatic source starting, special control of spectrum height, motor-driven camera racking, a camera masking device, a new photographic timer, a special spark-source timer and a calculating device.

During the war the Reynolds' spectrograph laboratories were staffed with women technicians who, of necessity, worked without full supervision on some of the shifts of the continuously operating plants. Primarily for their welfare, the safety hood, fig. 1, enclosing the spark stand of the spectrograph was developed. The hood incorporates several features which make for convenience and speed in routine use. These features include a safety window, an electrostatic shield, sound absorbing panels, and control devices.

The hood proper consists of a framed plywood box lined with acoustical material and covered with sheet aluminum. A typical wall section is shown in fig. 2. The hood is ventilated by a small exhaust blower which operates only when the machine is ready for use but not during periods of actual sparking. The interior of the hood is illuminated by a fluorescent lamp which is always on when the instrument is prepared for operation. Working access is provided by a window which can be raised and lowered. The window contains a pane of safety glass 24 x 24 in. and is counterbalanced by weights riding inside the framework of the hood. The window is held normally open by special light springs which are in tension when the window is lowered.

When it is lowered for operation, it is held by a small solenoid-operated catch which releases at the end of the sparking cycle. The springs then return the window to its open position to enable the operator to manipulate the sample. The window operates the safety and starting circuits. When completely closed, the window actuates a normally-open microswitch which controls a relay with sets of normally-open and normally-closed contacts. The normally-closed contacts open the circuit to the exhaust blower to keep it from creating agitation of the air within the hood during a sparking period.

The normally-open contacts close to permit the main contactor of the spark source to be energized by other

controls. Thus the window must be completely closed, sealing off the hood, before power can be applied to the sparking stand. Operators, therefore, cannot come in contact with the high potential as it is nowhere else accessible than at the spark stand. The addition of this safety feature is considered to be of greater benefit and importance than the time lost in operation of the window. Such lost time has been gained back by improvements in other parts of the general operation.

While being lowered, the window momentarily closes a switch energizing a memory type of electrical circuit which will start the sparking if the window is completely lowered within a short time interval after tripping the switch. The window must, of course, be completely closed before the spark actually starts.

The aluminum sheet is so applied that it forms a complete metal hood (excepting the window space), enclosing the rest of the assembly. This metal hood acts as an interference shield for both the analytical and rotary synchronous gaps. The aluminum sheets are of 2S alloy in 0.072 gage annealed. They are all well interconnected and grounded to electrical conduit. As is often the case, the spark gaps had been producing untenable disturbance in the densitometers located in an adjacent room.

Extensive grounding had not served to correct the effect to an extent that the spectrograph could be run while films were being read on the densitometer. This metal hood served to eliminate the interference until the source was moved to a more remote position necessitating long, high voltage cables separate from the hood. It then became necessary to enclose the cables in metallic grounded shields to eliminate the disturbances completely. Experience with shielded cables alone has indicated that the aluminum shield is of definite value in the total suppression of electrostatic interference.

Sound proofing was added to lower the high noise level of the spark gaps. It consists of acousti-celotex panels screwed on to the plywood and glued and screwed to the exposed flat surfaces of the spectrograph enclosed by the hood. With the acoustical material in place, the noise was greatly attenuated. This has reduced operator fatigue and the nuisance to nearby rooms.

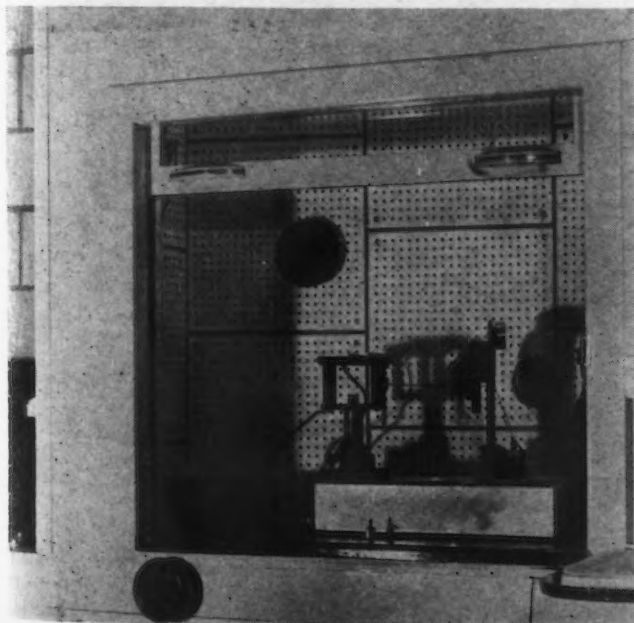
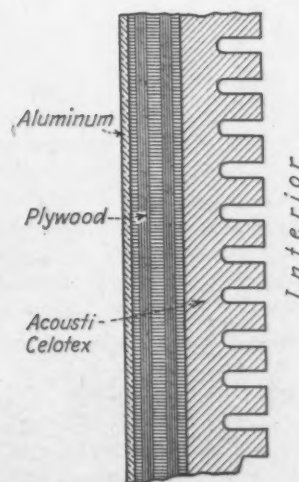


FIG. 1 — Safety hood in which the spectrograph is enclosed.

FIG. 2 — Typical wall section of the safety hood.



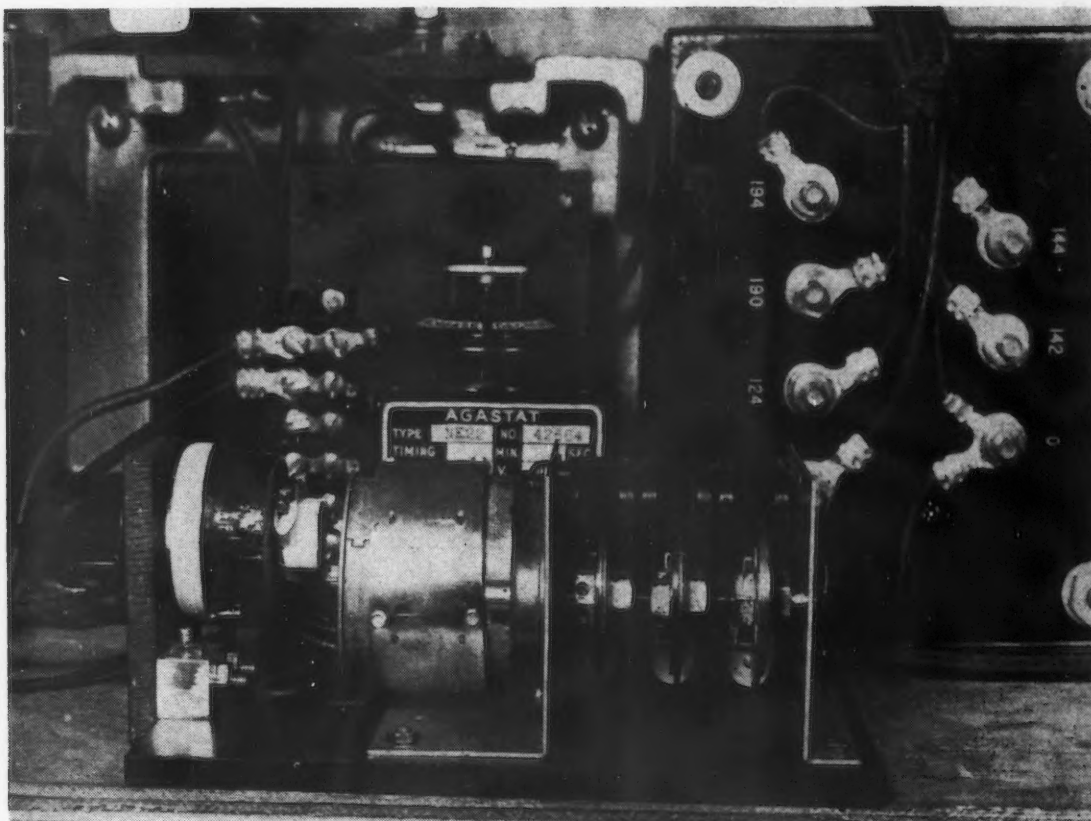


FIG. 3—Modified spark source timer.

The speed and ease of operation of the spectrograph has been further increased by modification of the original commercial spark source unit. The original working controls consisted of: (1) three toggle switches, (2) a manually-rotated three-gang resistor for input voltage control, (3) a manually-positioned rotary synchronous spark gap which controls the power output of the spark source, and (4) a momentary pushbutton to initiate the sparking cycle. In addition, the timers used for control of presparking and exposure sparking duration were mechanically adjustable.

The toggle switches were replaced by power relays which can be automatically energized in correct sequence and/or under safe conditions. The three-gang resistor assembly has been replaced as will be explained.

Reproducibility of the output of the sparking source is related to the reproducibility of the input voltage to the machine. Control of the input voltage is thus imperative. In the original installation this control was attempted by the incorporation in the circuit of three-ganged resistors, so connected as to afford some variation of the input voltage.

This arrangement, while relatively inexpensive, does not have sufficient range to correct for the usual line voltage variations encountered in industrial practice. From other viewpoints, as well, it is not a desirable method of voltage control. In the principal spectrographic laboratory at Reynolds, the control is obtained as described in the following paragraph.

The main feed to the source is passed through a specially designed constant voltage transformer of the resonance-reactance type. This transformer gives a stable output voltage when it is not subjected to line frequency variations. In actual practice, it became apparent that either frequency variation was occurring or voltages beyond the correcting ability of the trans-

former were being applied to it, for voltages differing from the desired output were obtained.

These voltages were stable for considerable periods of time but represented shifts of the stabilized voltage level. These voltage level shifts were eliminated by the addition of a motor-driven limited voltage range autotransformer which is controlled by a contact-making voltmeter. The combination of transformers has resulted in satisfactory voltage control on a line involving initial fluctuations of ± 20 pct. It is, unfortunately, a cumbersome and expensive assembly.

Reynolds is presently testing a newly-developed electronic voltage regulator which seems to have great promise of being the most satisfactory medium-priced solution to the problem yet found. The most perfect voltage source would probably be a large generator driven by a synchronous motor. The cost of such a set is, however, ordinarily prohibitive to routine laboratories.

Positioning control on the rotary synchronous gap was incorporated in the original machine to permit partial control of the output power of the source. The effect of such control is indicated by the voltage drop across the primary of the high voltage transformer. This voltage drop must be maintained at a predetermined level for a particular technique.

In the commercial apparatus, this was accomplished by receiving visual indication from a voltmeter and then manually rotating a hand wheel on the machine to reposition the spark-off point on the rotary gap. At Reynolds, the entire rotary gap assembly has been removed from its original housing and placed upon a shelf in the lower portion of the hood. In this position it is surrounded by acoustical material which greatly reduces its noisy operation.

The indicating voltmeter has been replaced by a contact-making voltmeter which actuates a reversible motor which positions the rotary gap assembly's adjustable element. For routine operation the voltmeter

is adjusted to a definite level and left alone. A change of output power level can be produced and stabilized by adjustment of a ballast resistor in the contact-making voltmeter circuit. This feature enables the source to be used under different conditions for special work.

The timer on the spark unit has been changed to obtain greater precision on routine work. The original equipment while versatile, was not sufficiently accurate in reproduction of timing and was too prone to accidental change of setting. In its place has been installed a cam timer, geared to the complete cycle of a spectrographic technique of 15 sec. It is shown in fig. 3.

In this timer a synchronous motor drives a shaft at the rate of 4 rpm. Located on the shaft are adjustable split cams which actuate microswitches at set points of the cycle. For the technique used in these laboratories, the cams are adjusted so that 5 sec after the start of the operation, the shutter over the slit is opened and light passes into the spectrograph. After 15 sec from the start of the sparking, the timer disconnects all power. A precise 5-sec presparking period and a 10-sec exposure time is therefore obtained.

The synchronous motor driving the timer has a magnetic brake so that it cannot coast after being deenergized. Other cams of the timer are used to release the catch of the safety window, to operate the solenoid of the electrode releasing device and to start the camera racking arrangement, all upon completion of the sparking cycle.

In laboratories not using a single time technique, timers of this nature can still be very useful. Any number of the units could be installed and wired in such a way that merely setting a selector switch would cause the automatic initiation of the desired sequence and duration of operation when called for.

The elimination of the manual adjustment of the usual timers with the resultant time loss and lack of reproducibility is held to be of great benefit for routine operation. The initial cost is also less than the type of timers ordinarily supplied by the manufacturers.

At the Reynolds laboratories a single technique has been developed that permits the spectrographic analysis of all aluminum alloys for all elements normally found in such material. For some alloys this means as many as 11 determinations per sample. This technique does, unfortunately, call for three spectra to be made for each sample run. This triple sparking involves removing the sparked carbon electrode, replac-

ing it with a new one which must be spaced, moving the sample so that the new spark position differs from the previous one and reinitiating the spark cycle.

This considerable sample handling at the spectrograph for a single complete analysis makes it advisable to do all possible to shorten the time required. This accounts for such slight refinements as having the safety window rise automatically at the end of the spark period. It also accounts for the incorporation of a simple device to eliminate the necessity of the operator disengaging the used carbon counter-electrode.

This device consists of a small solenoid which is energized at the end of the sparking cycle by one of the cams of the spark source timer as previously explained. It can be seen in fig. 1. The solenoid, by means of an insulating cord arrangement, releases the spring on the spark stand which has held the carbon counter-electrode positioned during the sparking cycle.

The released electrode drop through a hole in the optical bench and through an opening in the floor of the spectrograph hood. An aluminum tube then carries the electrodes through the space in which the rotary spark gap assembly is located and deposits them in a resiliently-lined box near the bottom of the hood. When the supply of fresh electrodes is depleted, the box is removed and the electrodes resharpened until too short for further use.

The camera on the spectrograph, as purchased, was designed to be racked vertically by hand. This operation has been changed to a power drive. The motor is a geared synchronous type controlled by an electronic timer which is automatically powered at the end of the sparking cycle.

The use of an electronic timer and synchronous motor makes it possible to obtain any desired number of spectra in the vertical plane. Overlapping of separate spectra is prevented by a continuously variable diaphragm located at the secondary plane of focus along the optical bench. This cutoff diaphragm must, of course, be adjusted to provide the correct spectrum height for any setting of the racking device.

The camera and hence the spectrum position is continuously indicated to the operator by a dial located inside the hood. Manual operation is still possible by means of a wheel located on the front surface of the hood below the window space.

Next week the author will discuss modifications of the masking device, the photographic timer, microdensitometer and the calculator.—Ed.

Direct Reading Thermometer for High Temperature Use

A THERMOMETER developed in Germany, for use at 950° to 1000°C (1742° to 1832°F), is described in *Iron and Steel*, London, July, 1946. This is reported to be the first successful application for the use of gallium as a thermometric liquid.

Expansion on solidification (at 86°F), a tendency to contaminate the capillary, and a tendency to break thread on falling temperatures, are three primary dis-

A mercury-in-glass thermometer for use up to 1275°F was reported in THE IRON AGE, Apr. 26, 1945, p. 72.

advantages which have withheld previous use of gallium. The first named difficulty has been overcome by a new design, in which the reservoir is tapered up-

wards; the latter two difficulties are still apparent to some degree.

The instrument investigated had found use in a German aluminum reduction plant, while another thermometer was found in a coke calcining retort. Tests made against a noble metal thermocouple showed that at working temperatures the error is about plus 7.2°F.

The thermometer was constructed entirely of quartz, except for (1) an opal glass scale, (2) a nickel-plated brass cap cemented in place with plaster of paris and containing two cork supports for the top of the scale, and (3) the filling, which proved to be (spectrographic examination) pure gallium contaminated with a trace of iron. No traces of tin and indium as alloying elements were found.

Hot Air Dryer Doubles Galvanizing O

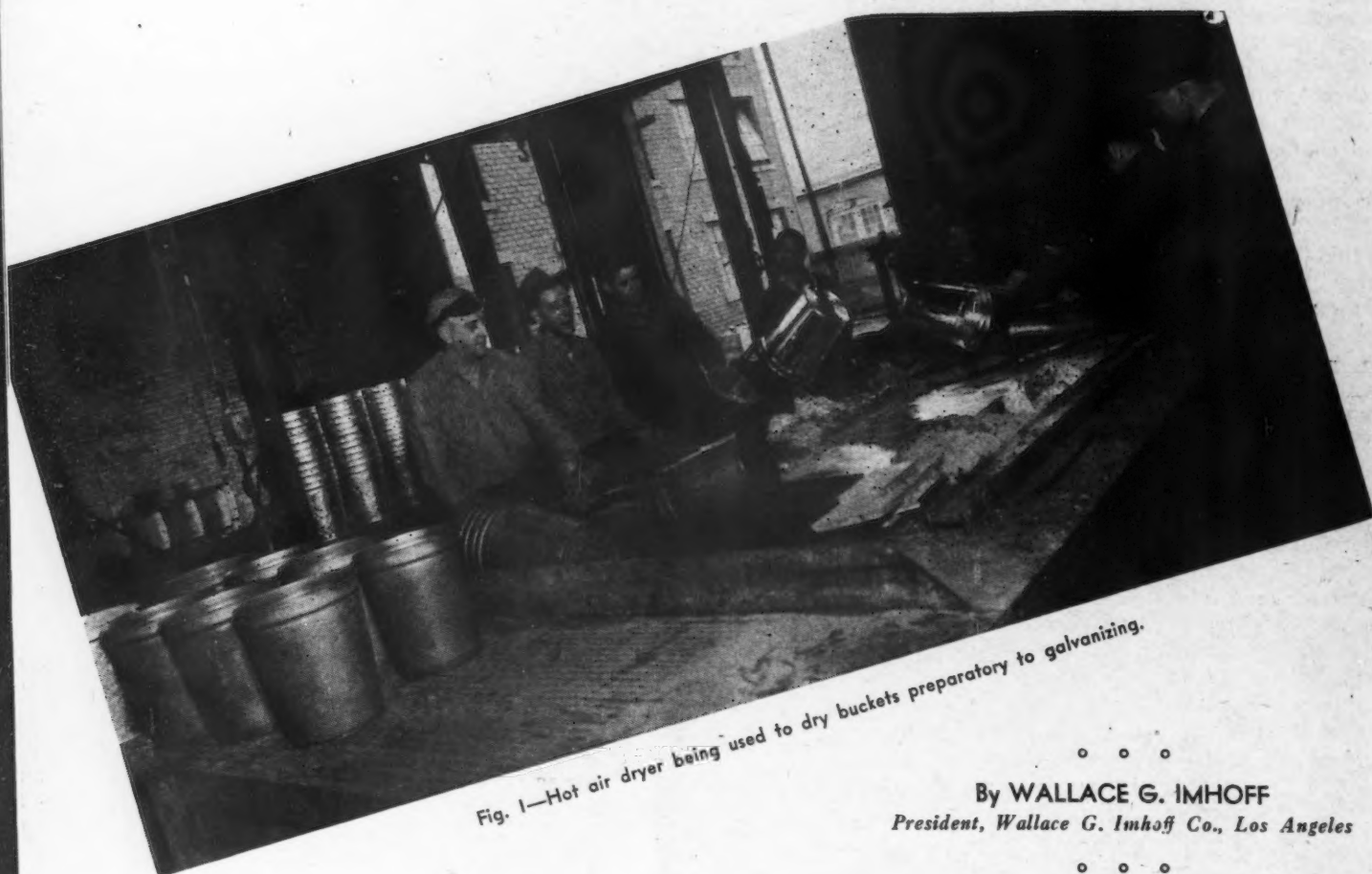


Fig. 1—Hot air dryer being used to dry buckets preparatory to galvanizing.

By WALLACE G. IMHOFF

President, Wallace G. Imhoff Co., Los Angeles

Development of a new hot air type dryer for hot dip galvanizing operations is discussed in this article. This dryer, which replaced a steel hot plate type dryer, is reported to have doubled the productive capacity of the galvanizing room of an Eastern plant.

RECENT installation by the James Hill Mfg. Co., Providence, of an entirely new type of dryer—a hot air dryer—marks an important advance in hot dip galvanizing methods and has, according to the company, doubled its galvanizing capacity in addition

to giving higher quality output at lower costs. This new type dryer replaced an old steel hot plate dryer.

Fig. 1 shows the new dryer installation at the James Hill Mfg. Co. plant in use for drying buckets preparatory to hot dip galvanizing. The dryer is at the left with buckets being dried on it. Fig. 2 is a general view of the Hill pickling department, showing the pickling tank near the windows, the water rinse tank to the right, and the liquid flux tank to the left. A close-up of the dryer is presented in fig. 3, illustrating the top lattice construction. Fig. 4 is a side view of the dryer, showing the loading platform, gas burner and air arrangement. Note that the hot air dryer sits

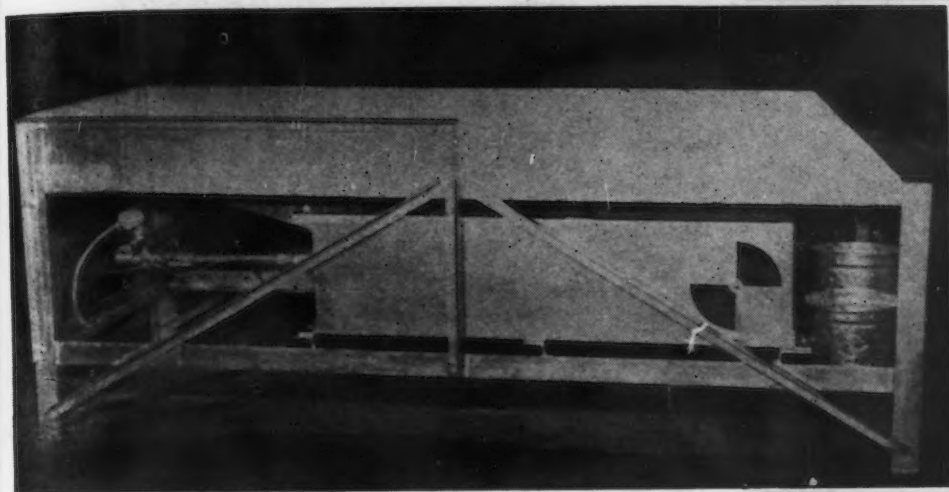


FIG. 2—Pickling department of the James Hill Mfg. Co., Providence.

Output . . .

BELOW

FIG. 4—Side view of the hot air dryer, showing loading platform and gas burner and air arrangement beneath.



Photos courtesy James Hill Mfg. Co.

across the end of the galvanizing furnace beyond the loading platform of the dryer. Fig. 5 is an end view of the dryer showing the gas and air heating equipment at the right and the drain chute at the left (forward). The control switch is located at top left, on the dryer leg.

Reports from the company, for which the author is galvanizing consultant, are that after hooking up the new dryer, the first test was to dry 1¼ in. clout nails. A batch of 400 lb of these small nails was put up and within 6½ min the operators were starting to put the nails into the galvanizing kettle. This was described as the fastest drying rate the company had experienced. The 400 lb of clout nails were pickled in Monel crates. Previously, the largest quantity of these nails that could be pickled in a batch was 250 lb and this smaller amount required more labor than the larger batch using the new dryer.

Based on observations and tests, the Hill company believes that it will be able to dry such items as malleable pipe, unions, nuts, bolts, screws and nails at the rate, if desired, of approximately 3600 to 4000 lb per hr, which will give the company ample margin for the production capacity of the galvanizing kettle. This capacity is approximately double the output available when using the previous drying method.

Summing up the experiences of the Hill company, the advantages of the new type dryer are shorter drying times and correspondingly high production; improved quality through uniform drying without burning or corrosion on the dryer, and an overall decrease in costs due to the cumulative effects of all these factors.

This new type dryer was developed to overcome some of the disadvantages of the old steel hot plate



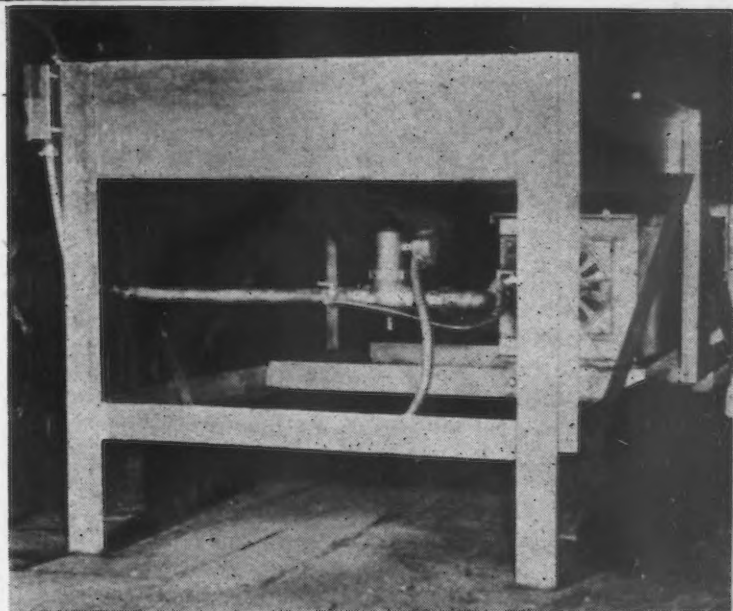
ABOVE

FIG. 3 — Close-up of the hot air dryer.

o o o

BELOW

FIG. 5 — End view of hot air dryer. Note drain pan to the left front.



dryer, such as a lack of uniformity in heat distribution over its surface. There usually existed an extremely hot area in the old dryers. A paradox of the operation of the old type dryers was that while the surface was pickled cleaned in the sulfuric acid, after drying on the hot plate dryer, the articles often became badly rusted and corroded again on the dryer. A test indicated a drying temperature under the work of 576°F. Thus, articles packed in a pile, with little access for air to circulate between the articles being dried, were soon "burned" or badly rusted beneath, while articles on top of the pile steamed and slowly built up a green corrosion product and they too, finally rusted. These disadvantages have been largely overcome in the new type dryer.

Pressure Welding Thin Aluminum Parts

By H. E. LINSLEY
Machine Tool Editor

PRESSURE welding of aluminum is carried out with the material in the plastic condition, using high pressure, and the process is one which leaves no cast structure behind. To obtain a reliable joint there must always be a definite deformation of the material. According to reports by investigators in Germany, two thin sheets are laid cold, one on the other, between two hot welding teeth on dies, as shown in fig. 1a. In this illustration, A represents the die teeth, B is the stop to prevent excessive pressure on the work, and C is the material being welded. The sheets are heated by the die and are then pressed together until the condition shown in fig. 1b is reached. A suitably arranged stop prevents the application of excessive pressure, though this precaution can be omitted with hydraulic presses because, by reason of the hardening brought about in the material, a definite weld seam is associated with a definite pressure. With toggle presses the weld-seam thickness is determined by the stroke of the press.

Welding action in the microstructure itself is illustrated in fig. 2. On the left is shown to scale the shape of the welding die teeth, with the component enlarged. On the right are micrographs of the weld. In the micrographs the separating line between the sheets, visible in the top illustration with a small deformation, becomes less clearly defined as the weld seams become thinner with a higher degree of deformation, and has completely vanished in the sections shown in the lower micrographs. Material squeezed out to the side in the component is clearly recognizable from the zone of the weld by its waviness, and the width of this wavy zone is a measure of the deformation of the weld. The amount of material pressed out between one degree of deformation and the next is shown by a_1 — a_2 . Along its length the width of the squeezed out zone increases. It is $a_1 = b_1$ and $a_2 = b_2$ and $a_3 = b_3$.

Welding is always coupled with hot deformation. Figs. 3 and 4 show an article made in considerable numbers by this process at the Junkers & Flugzeug Motorenwerken A.D. Two sheets of 0.4 mm Pantal¹ are laid between heated dies, heated, welded and formed at the same time with compressed air.

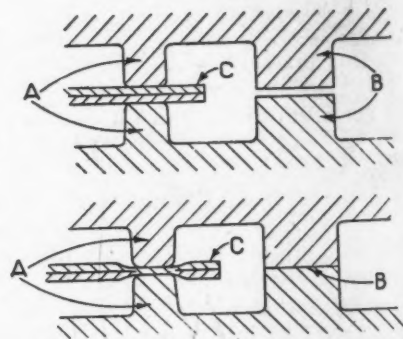
¹ Pantal conforms to German Spec. Flw 3355 and consists of 0.79 Mg, 1.10 Si, 0.85 Mn, 0.39 Fe, 0.02 Ti, 0.13 Cu, 0.15 Zn, 0.05 Ni, remainder Al.

The whole operation, including loading and unloading of the press, takes 30 sec. It will be seen that the process combines forming in the hot condition with

welding. It is also particularly suitable for large-quantity production. Where forming is not required, any undesirable buckling must be prevented by the use of compressed air or other means.

There are several possible explanations of the welding action. One suggests that when a deformation is brought about in the hot condition (for example, by a hammer blow) the crystals break up, spontaneously grow together again because of the high temperature present, and in doing so join with other crystals that formerly belonged to other parts. Another possible explanation is that if the atomic lattices, when hot, are

FIG. 1a and 1b—Diagrammatic illustration of pressure welding principle, showing how deformation of sheet material occurs in the ultimate stage:



sufficiently pressed together, welding takes place. Because of the practically unavoidable oxide skin on aluminum it is difficult to determine anything experimentally about this.

The process has been developed for light-alloy cooler parts. Fig. 3 shows part of an aftercooler and fig. 4 gives the cross-section. It is press welded from a flat sheet of 0.4 mm Pantal and formed by blowing out while hot by compressed air. For water and oil coolers other elements were developed.

The chief part of the welding plant is the two-sided die A and B shown in fig. 5. These dies must be made with great accuracy. For material an alloy tool steel with the following composition was adopted: C 1.8 to 2 pct, Si 0.5 pct, Cr. 12.3 pct, V 0.45 pct, and Mn 0.5 pct.

A die life of 750,000 welding operations has been attained in welding annealed Pantal. It is probably possible to reach a million, after which light machining of the die might be necessary. The shape of the die teeth for sheets from 0.2 to 0.5 mm. thick is shown in fig. 6. For thicker sheets broader teeth are re-

A German method of simultaneously welding and forming thin-walled aluminum parts is discussed herein. This review, covering two German plants utilizing this procedure, is a correlation of a report published in Aircraft Production, London, and a recent publication of the TLIC Aeronautics Subcommittee and describes the use of pressure welding for fabricating aircraft radiator fins and similar hollow components.

quired. Builtup dies for water coolers have been found satisfactory for a thickness of sheet down to 0.2 mm.

The welding dies are heated by platens of heat-resisting steel (C and D in fig. 5) which are in turn heated by gas burners, each with two pipes. Round them are situated heat-insulating boxes filled with slag wool. Water-cooled plates (F and G) protect the press against excessive heating. At the temperature concerned use of movable screw connections is not possible, and the hot removable dieplates are fixed by keys. Hydraulic or toggle presses, can be used, but the toggle press has shown itself to be the best. The component shown in figs. 3 and 4, with 13 m length of welded seam, needs 120 to 130 tons load.

Heating can be carried out electrically. Immersion heaters set in lead have not been found successful, but silicon carbide rods are better. Wire coils take up too much room, and gas has proved in practice to be the most reliable medium. With gas heating, temperature regulation must be carried out with chopper-bar regulators and electromagnetic valves. Thermostats have not proved to be successful.

The necessary compressed air is obtained from blowers, and complete independence of pressure fluctuations in the gas and compressed air systems must be arranged. The outer tooth of the dies and their two ends have a heat insulation of importance in securing uniformity of welding. Without insulation the outer and most important tooth would be colder than the inner one and the two ends of the die would be, in general, somewhat colder than in the center.

For the admittance of the compressed air a ring with radial orifice is inserted between the sheets in previously formed depressions, fig. 7. Air is admitted to the ring through a central hollow pin. The thickness of the ring is chosen so that it tightens with the sheet on the two halves of the die. The compressed air is admitted and exhausted through a valve operated by the toggle press.

The time of 30 sec for the manufacture of a welded article of two 0.4 mm sheets is made up as follows: 5 sec heating time (towards the end of which compressed air is blown in), 1 sec welding time, 5 sec for exhausting the compressed air, and 19 sec for reload-

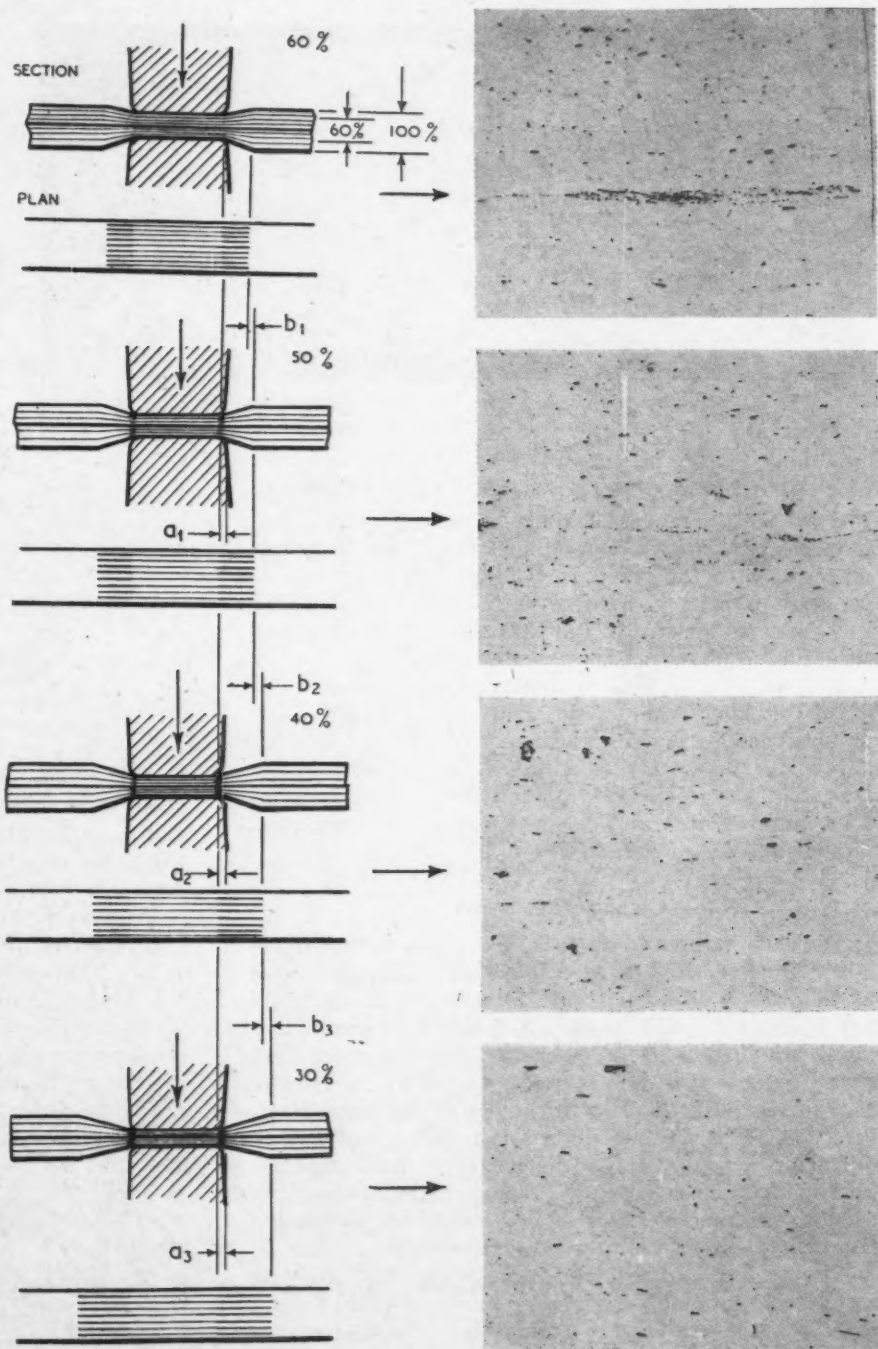


FIG. 2—Progressive stages of deformation, with corresponding micrographs of weld zone. The percentage figures indicate the thickness of the weld seam, which is expressed as a percentage of the original thickness of the metal sheets before welding.

ing. The press runs continuously and determines the tempo of the work. Theoretically, therefore, two parts can be produced per minute.

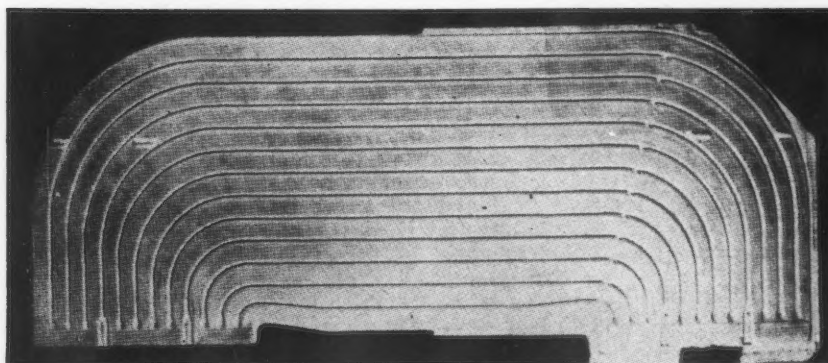
Dies which have produced 300,000 pressings appear to be capable of producing as many again.

The temperature at which aluminum is pressure welded varies, according to the alloy, between 788° and 896°F, and the pressure necessary varies between 1.9 and 5.1 tons per sq in. For annealed aluminum the pressure figure is low and for Pantal it is of the order of 3.2 tons per sq in.

The amount of the necessary deformation for continuous working of annealed Pantal is about 50 pct. It is considerably affected by the fact that the sheets

Dust, dirt or talc that penetrate into the weld seam similarly cause faulty spots. Cleaning the sheet by etching alone is out of the question, as, in drying, the water collects in spots and at the last spot to dry there will be a concentration of metallic salts originating from the etching process. These so-called water spots are also sufficient to cause faults. Main supply water also is not sufficiently neutral, while distilled water absorbs from the air carbon dioxide and attacks metals more sharply than do many main supply waters.

Brushing alone, without pickling, may be successful several hundred times, only to bring about a sudden series of failures through grease not observed and not



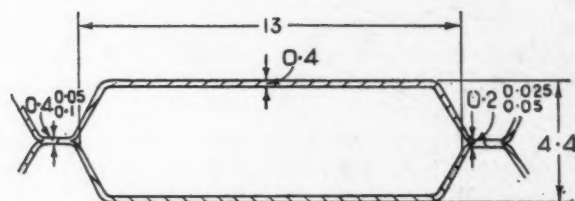
LEFT

FIG. 3—Aftercooler component in 0.4 mm Pantal, pressure welded and formed by air pressure while hot.

o o o

BELOW

FIG. 4—Cross-section of one corrugation of the aftercooler element shown in fig. 3. Dimensions are in millimeters, and tolerances for the weld seam are given.



must not be left for more than 1½ hr after the cleaning of the surface and removal of the oxide skin; before this fact was known there was a very high rate of scrap with the process. Cold-worked sheet can be pressure welded with more satisfactory results than can annealed sheet. In the manufacture of the sheet, therefore, a heat treatment can be saved.

Pressure weldability of various aluminum alloys is in the following order: First, cold-worked Al-Mn sheets and pure, cold-worked aluminum. Next Pantal and the Al-Zn-Mg alloys. Hydronalium is considerably worse. Duralplat and duralumin had not been found satisfactory, but research work on them was not completed. Magnesium alloys cannot be pressure welded.

Cleaning the Sheet

The cleaning of the sheet is of decisive consequence. First, the grease must be removed. The procedure is as follows: A ½-min dip in 15 to 20 pct caustic soda not hotter than 122° to 140°F, rinsing in water, and finally dipping in 15 to 20 pct nitric acid at room temperature and rinsing in water. Pickling in caustic soda, often recommended, without previous acid treatment or after alkaline degreasing, is not sufficiently uniform. Drying of the sheet can be done satisfactorily only in an electrically heated furnace. In a gas furnace the surface becomes so attacked by fatty acids from the gas that faulty places continually occur.

After they have been dried the sheets are brushed on the welding side with a roller brush. Even a fingerprint will cause a fault. According to the diet of the person in question, the fingerprint will be either alkaline or acid, and will combine with the metal to form a chemical compound which is only removable by grinding-off or by wire brushing; wiping is useless.

removed. The cheapest method of cleaning on a large scale is to etch the sheet before the last pass in the rolling mill, finish with polished rolls, and to brush the sheet after it has been delivered to the works for pressure welding.

To prevent the work from sticking to the die two points should be noted:

(1) There should be a quite definite roughness of the welding tooth which cannot be correctly obtained with machine tools. Too high a finish increases the tendency to stick, and from a hard chromium plated die the article cannot be freed at all.

The tooth is first ground and before the initial heating is thoroughly coated with talc-saltpeter mixture. The first six to ten welded parts stick fast and must be torn off. Then, as the tooth becomes rough, sticking becomes less frequent and eventually ceases altogether.

(2) Every second sheet should be thinly smeared with a mixture of talc and saltpeter (in proportions of 2:1, mixing with water) and washed immediately after the welding because of the danger of corrosion. As the saltpeter, melting at about 572°F, causes a slight dampness of the die, enough salt and talc sticks to the welding tooth after the welding in the die for

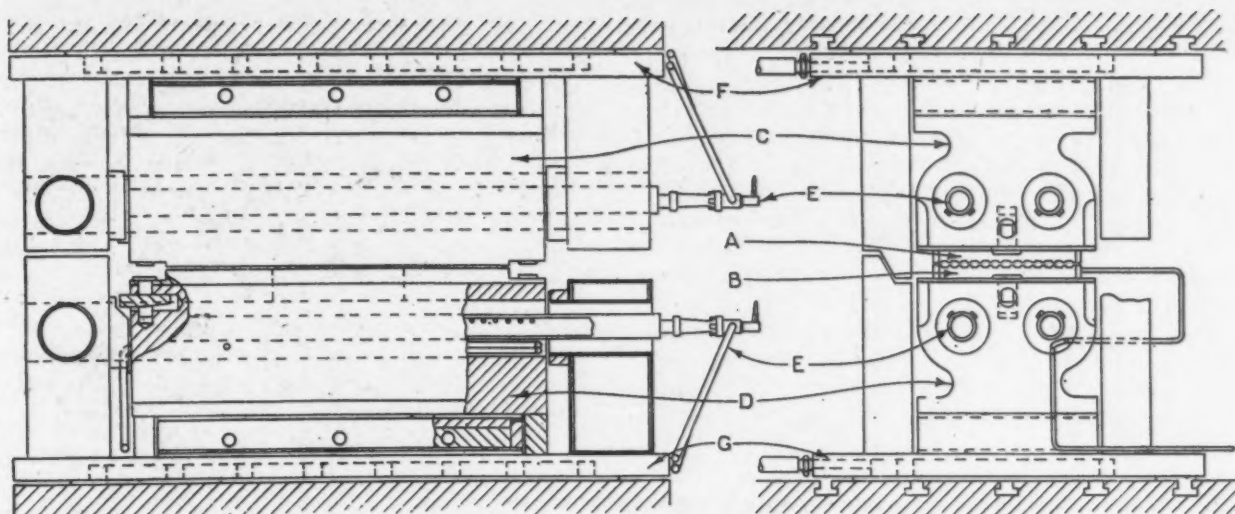


Fig. 5—Layout of pressure welding machine as developed in the Junkers factory for production of aftercooler elements.

one article to be welded without application of lubricant.

Starting Up and Die Setting

Cooling water, gas, compressed air and current are first connected. Before being heated, the dies are tested for correct setting of the upper and lower die holders and are brought together. In the heating, the ram and bedplate platens distort, as they remain cooler on the sides nearer the press than on the dies. The amount of this distortion depends, of course, on the temperature. For compensation, steel foil is inserted between the upper die holder and the upper die.

To determine the thickness for the necessary compensating layer one job is welded. If the weld varies in thickness it is because of the distortion of the die holder. To compensate for this fault two step-shaped packing pieces of steel foil are inserted over the upper die and altered after successive weldings until the desired thickness is obtained all over. They are then secured against shifting by spot welding.

Air for forming should be at a pressure of 170 to 256 psi. Higher pressures cause the elements to split or become porous, while lower pressures do not form the work completely. The compressed air itself must be free from condensed water and oil, as both contain fatty acids which attack the sheet. The air must not be admitted too late, as otherwise it can no longer press out any buckling which occurs. If introduced at the right moment, however, it prevents buckling.

For continuous working it is advisable to change the die sets at regular intervals for inspection and the making good of local damage, and to free them from adhering light alloy. Faulty welding repeats at damaged points. Light alloy adheres to the edges of the die teeth, particularly if they are of the wide pattern, e.g., 2.5 mm as against 2 mm. It imparts to the original tooth a rough edge, and occasionally leads to leakiness at the welded seam. The dies can be quickly cleaned for pickling for 8 to 10 min in hot caustic solution.

The temperature indicator should be checked weekly and worn out burners replaced. The tightness of all

gas connections and water pipes must be tested every week.

The requirements for the tightness of the cooler elements were particularly severe. The element shown in fig. 3 and fig. 4 was tested for tightness under water, once between two supporting walls with compressed air at 21.3 psi and once without supporting walls with compressed air at 2.13 psi. Scrap from all causes amounted to between 2 and 5 pct even with thoroughly degreased sheet surfaces. This is a common value for deep-drawn sheet parts.

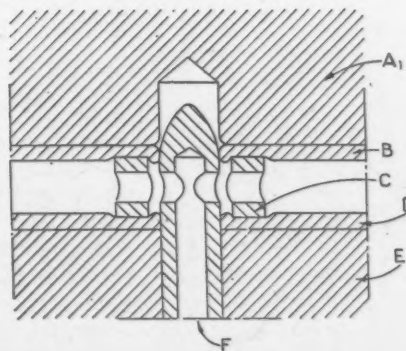
If a weld seam is not tight in the pressure test, it is first seen whether the leak is near the weld or whether the sheets gape where they should be welded. If they gape the seam is opened up with a knife to determine the length of the damage. Usually the cause is found to be dirt on the inside which was either on the sheet or entered with the compressed air in the forming. If this test fails the thickness of the welding seam should be tested. Too thick a seam can cause failure. The two sheets are separated to determine whether the thickness is correct at the ends of the fault.

Too great a thickness is usually the result of wrong

RIGHT
FIG. 6—Typical die tooth shape for pressure welding die. Dimensions are in millimeters.



RIGHT
FIG. 7—Method of admitting compressed air during welding. A, upper die; B, upper Pantal sheet; C, annulus with radial holes; D, lower Pantal sheet; E, lower die; F, compressed air supply.



working temperature, which can be corrected by subsequent adjustment, or slowness in heating, in which case compensation is made by movement of the packing material. In exceptional cases it is due to excessive width of die teeth, causing such a high local increase in pressure that elastic deformation occurs in the tool. In such a case the die must be rectified. If everything else is correct, if the weld seam along its length and width is free from cracks, if no dirt is visible, and if, in sectioning the faulty place transversely, no lack of alignment of the welding teeth is found, then the welding was done at too low a temperature.

Faults at the margin of the weld seam nearly always run back from the flange of the margin. Pickup gives too small a wall thickness which weakens the material in addition to the weakening due to reduction of section. Faults near weld seams free from cracks occur in the inner weld seams through too high an air pressure in forming, through too great local depth of the groove, or through lack of tooth alignment. Testing is done by cutting up the element and examining the section. Too great depth of groove or lack of alignment in the teeth must be eliminated by adjustment of the dies.

Adam Opel Plant Practice

This same type of pressure welding was carried out at the Adam Opel automobile plant at Russelsheim, Germany, in the manufacture of aircraft radiator fins. At this particular plant the aluminum strip is delivered in carefully packed rolls approximately 400 ft long, about $9\frac{3}{8}$ in. wide and 0.015 in. thick. Particular care is taken to see that it is free from grease or dust, and all moisture is carefully avoided so as to prevent oxidation. The thickness of the material is a critical factor and must be held within very close limits.

At the factory the stock is unrolled by a power-driven winch and passed under two successive wire brush stands. These are equipped with wooden work tables to support the sheet while brushing, and the inner side of the stock, which later becomes the welded side, is very thoroughly cleaned. Any remaining imperfections are carefully removed by wire brushing with a motor-driven hand brush, and thereafter particular care is taken that the cleaned surface is not touched by even gloved hands. The stock then passes to a special combination press, drill and shear where two recesses are formed for the air inlet collar, a hole is drilled in the bottom of each, and the material cut off to length.

The sections are then placed on a table, cleaned side

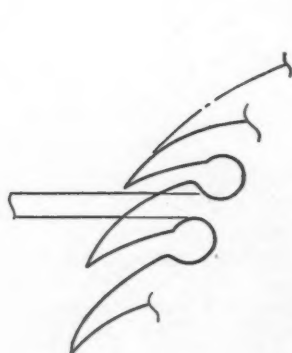
up, and the hole in one recess located by means of a dowel. The air inlet collar is dropped over the dowel, and the sheet folded flat so that the hole in the second recess also engages the dowel. In this position the unit is spotwelded at three spots to hold the collar in place, and also at two or three spots around the open edges. Salpetrol is now rubbed lightly and evenly with a cloth on both sides of the parts to prevent the aluminum from sticking to the dies, and the parts are placed in the die, locating on the air blower nozzle. Salpetrol is a compound consisting of tallow 1.6 kg, water 3.5 kg, sodium nitrate 0.85 kg, potassium nitrate 0.3 kg, and potassium bromate 0.015 kg.

The dies used for this particular application are about 3 ft long, 2 ft wide, and $2\frac{1}{2}$ ft high, and are heated by gas to a working temperature of 842°F . It is necessary to heat the dies for about 6 to 8 hr before starting work in order to bring them up to temperature. The air pressure of the air cushion in the machine table amounts to 2.5 to 3.5 atmospheres, while the air pressure at the outlet nozzle of the fin amounts to between 18 and 24 atmospheres. The pressure in the air cushion and at the outlet nozzle depends upon the physical properties of the material being worked, and any change in material necessitates some experimental work to develop the optimum pressures. The air used for inflation is heated to 842°F in a Schlangen-Rohr system. After completing 10 to 15 pieces it is desirable to clean the equipment thoroughly by means of a wire brush to remove the Salpetrol residue.

When cool, the edges of the fin sections are trimmed all around the outside and the part is pressure tested under 15 atmospheres. The outside is then finished with a piece of rounded wood and the part again tested at 15 atmospheres. This is followed by a pressure test at 1.5 atmospheres with the work unsupported, after which the head ends are trimmed on a high-speed circular saw. To assure a clean cut the saw is equipped with the so-called wolf teeth as shown in fig. 8.

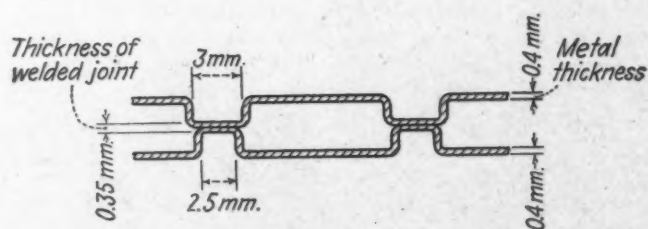
The welding press operates at two strokes a minute, and to allow for slight misalignment between the upper and lower dies the welding tips on the upper die are made 3 mm wide, while those on the lower die are 2.5 mm wide, so that the contact area remains at 2.5 mm at all times, see fig. 9.

After completion of the individual fins, these are welded together by hand to produce the radiators for the Ju 87 and Ju 88 airplane. The welding is performed in individual booths equipped with colored visors to protect the operator's eyes. The hoods are connected to an exhaust system to carry off the heat and increase the efficiency of the welders on this tedious and painstaking work.



LEFT
FIG. 8—Trimming the ends of the welded sections to a clean cut is made possible by the use of a wolf-tooth cutter as shown here.

RIGHT
FIG. 9—Enlarged cross-section of an Opel aircraft radiator fin produced by pressure welding. The difference in the width of the upper and lower joint faces allows for slight misalignment.



Behavior of 18-8 Ti-Stabilized Stainless

Various means for detecting and combating intergranular corrosion in 18-8 stainless steel are discussed in this, the first part of a two-part article. The effects of the stabilizing elements, titanium and columbium, on the physical properties of wrought 18-8 stainless steels are also considered together with precautions to be observed in calculating proper ratios of these elements for best results.

By ERNEST H. WYCHE

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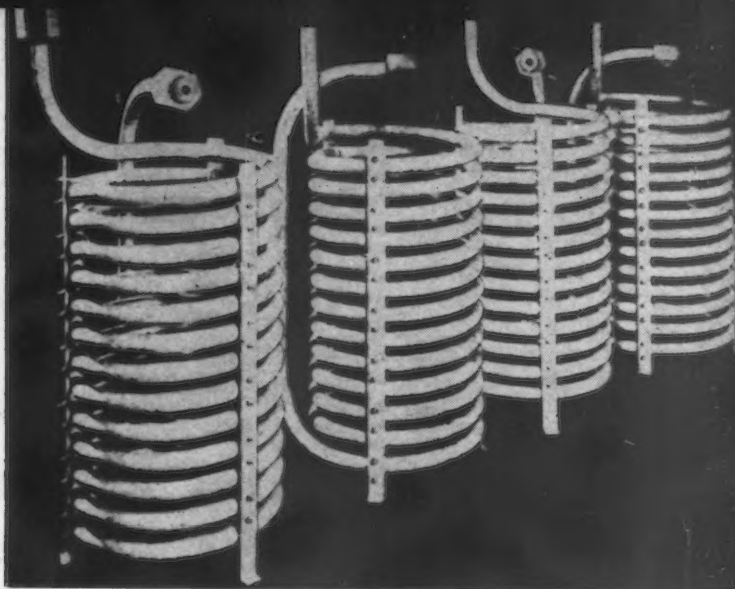
THE 18 pct Cr-8 pct Ni types of stainless steels have become popular because of their marked resistance to corrosion and heat (fig. 1), their freedom from air hardening following welding and their good formability. This 18-8 group comprises half of all the stainless steel grades sold. With such wide usage numerous problems have come up which often necessitate the development of special purpose steels. Intergranular corrosion was probably the first and most serious of these problems because failure was liable to occur without visual warning.

In a subsequent issue of THE IRON AGE the author will discuss high temperature tensile strengths, weldability, corrosion resistance and stabilizing heat treatments of 18-8 stainless steels.

Had this problem not been solved the 18-8 steels would have been much more limited in their usefulness.

When this material is welded there is a region near the weld zone in which intergranular carbide precipitation occurs and at which position there may result intergranular attack in certain corrosive media. The magnitude of these effects is reduced by employing steels of the lowest available commercial carbon content, 0.08 pct max.

These effects can be further completely eliminated by subsequent annealing following welding and prior to service. In many instances because of design factors such as warpage, distortion and size,



• Heat exchangers made of 18-8 Ti seamless tubing, a typical commercial application for this type of steel.

this procedure is impractical. Under such conditions these hazards are eliminated by the addition of stabilizing elements such as titanium or columbium, which form more stable carbides than chromium and thereby prevent intergranular precipitation of carbon and corresponding intergranular corrosion.

This article presents a brief discussion of some of the methods used to combat intergranular corrosion due to carbide precipitation, with particular emphasis given to the uses and applications of 18-8 Ti, designated according to the American Iron & Steel Institute as type 321. Though 18-8 Ti has been used successfully for 15 yr or more, considerably increased tonnages went into war equipment, such as aircraft exhaust assemblies, and certain military usage involving welding, brazing or exposure to elevated temperatures.

Just as long as only the requirements of heat resistance, formability or weldability need be met, plain 18-8 is satisfactory. However, few applications are as simple as this. When intergranular corrosion resistance is also required for certain con-

Welding of 18-8 stainless stabilized with columbium and titanium is discussed in the article "Welding Stabilized 18-8 Stainless," Hafsten, THE IRON AGE, July 11, 1946. Intergranular corrosion in 18-8 used for aircraft manifolds was discussed in the article, "Carbon Absorption of 18-8 Stainless Steels," Hubbell, THE IRON AGE, June 20, 1946.

ditions, definite precautions must be taken. Lowered corrosion resistance due to carbide precipitation may result from (1) brazing or welding during fabrication or repair, or (2) prolonged use at elevated temperatures.

Much commendable work has been done to solve the problems of intergranular corrosion by workers in this country and abroad.¹⁻¹⁰

When the need for preventing intergranular carbide precipitation became recognized, it was necessary to devise means of detecting its presence. This has been far easier to do than to go one step farther and predict suitability for a given application, on the basis of an acceptance test.

Methods of detecting the presence of precipitated carbides depend upon the use of an accelerated corrosion test or on metallographic examination. Some methods currently used in testing for intergranular carbide precipitation are:

(1) **Acidified Copper Sulfate Test**—This test,

known as the Strauss or Hadfield test, is probably the oldest and most commonly used. Use is made of a dilute sulfuric acid solution that is so buffered with CuSO_4 * that metal free of intergranular carbide precipitation will be unattacked, whereas those regions, such as near welds, will be attacked intergranularly by virtue of the intergranular carbide

* The two most commonly used solutions are as follows:

1. Copper sulfate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$)..... 13 g
Sulfuric acid (sp gr 1.83)..... 47 cc
Water: Sufficient to make a liter of solution.
2. Copper sulfate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$)..... 100 g
Sulfuric acid (sp gr 1.83)..... 100 cc
Water 900 cc

precipitation. In the test the solutions are used in the boiling state and maintained at constant concentration by the use of a reflux condenser. With each of the above solutions boiling is carried out under a reflux condenser for a period of at least 3 days.

When only a qualitative measure of intergranular attack is desired, the specimen is either; (a) Dropped on a hard surface; attack is indicated by a loss of sonority, or (b) Bent about a radius usually equal to the thickness, or flat upon itself. Failure in the bend test is evidenced by cracking. The sonority test is the least sensitive of all tests to detect intergranular corrosion hence should not be relied upon to detect anything but severe attack.

When quantitative data are desired, the acidified copper sulfate-electric resistance measurement method of Rutherford and Aborn⁹ is recommended.

(2) Accelerated Corrosion Tests in Acids—These tests, in order to simulate severe service, are conducted in warm acids, the temperatures and acid

concentration, or mixtures, selected depending upon the test.

- (a) Mixtures of nitric and hydrofluoric acids. Mixtures ranging from 5 to 15 pct of the former and 1 to 5 pct of the latter are used in the warm condition, at about 150°F. In this test the specimen is immersed for a minimum of three 1-hr cycles, using fresh solution each time to delineate attacked zones from unattacked zones. The attacked zones, which are areas of intergranular attack, can be readily seen visually if intergranular carbide precipitation exists. As indicated under the copper sulfate tests, a more searching evaluation can be obtained by bending and determining the degree of cracking.
- (b) Concentrated nitric acid, either 65 or 67 pct. This is called the Huey test and is used as an acceptance test but is, unfortunately, also used to detect the presence of intergranular carbide precipitation and to predict corrosion behavior in solutions other than nitric acid. This is discussed more fully under corrosion.
- (c) Weak mixtures of sulfuric and nitric acids, known as the "weak mixed acid corrosion test."

(3) Metallographic Examination—All of the above may be supplemented by, or used in conjunction with, an examination of a properly polished specimen etched in suitable etchants. Several are described in the literature.^{8, 12, 13} Two widely used electrolytic reagents are aqueous 10 pct NaCN and 10 pct oxalic acid.

(4) Tests for Simulated Welding or Brazing—For simulating conditions of sensitization by welding,

TABLE I
Mechanical Properties of Wrought 18-8 Titanium-Stabilized Steel

CHEMICAL COMPOSITION, Pct							ASTM Designation.....		A 167-42	A 240-42
Carbon.....	0.10 max	Silicon.....	0.75 max				ASTM Grade.....	5	T	
Manganese.....	2.00 max	Chromium.....	18.00 min				AISI Type Number.....	321	321 is similar to grade T	
Phosphorus.....	0.035 max	Nickel.....	8 min				Structure.....	Austenitic	Austenitic	
Sulfur.....	0.03 max	Titanium.....	4 × C min							
MECHANICAL PROPERTIES										
Form and Treatment	Tensile Strength, Psi	Yield Strength (0.2 pct offset), Psi	Yield Point, ^a Psi	Proportional Limit, Psi	Elongation in 2 in., Pct	Reduction of Area, Pct	Impact Resistance, ft-lb		Hardness Number	
							Charpy	Izod	Brinell (3000-kg load, 10-mm ball)	Rockwell
Sheet:										
Cold-rolled.....										
Annealed.....	85,000 ^b		35,000		54				B80	180
Strip:										
Cold-rolled, 35 pct.....	147,000 ^b	136,000			7					
Annealed.....	88,000 ^b		39,000		56				B80	180
Wire:										
Cold-drawn (20 pct.....)	100,000	90,000		40,000	23				C20	
Cold-drawn (40 pct.....)	145,000	130,000		70,000	10				C32	
Cold-drawn (60 pct.....)	190,000	175,000		95,000	4				C37	
Annealed.....	90,000	30,000		20,000	55				B85	180
Plate:										
Annealed.....	89,000		38,000		55	60	100	170		180
Tubing:										
Cold-drawn.....										
Annealed.....										
Bars:										
Cold-drawn.....										
Annealed.....	90,000		40,000		55	60	100	170	B85	180

^a Yield point as determined with dividers must not be confused with a defined yield point strength, such as, at 0.2 pct offset.
^b This is a representative and not a minimum value.

brazing or stress relieving, numerous specifications have been devised. Two government specifications for simulating welding are the Navy 47-S-20a and Air Corps AN-QQ-S-757. The general pattern calls for heating a small specimen at 1200°F or 1250°F for a short period such as 10 min or 2 hr, followed by air cooling. The specimen is then examined for precipitation of carbides by one of the above methods, usually the bend test, or it may be subjected to metallographic examination.

The above methods are used for detecting precipitated carbides and the degree of corresponding intergranular attack. The evaluation of such data with respect to service performance is a complex subject. For example, Hubbell¹¹ has recently reported that the copper sulfate test is too severe for predicting usefulness in aircraft exhaust assemblies because failures in this test do not necessarily indicate poor service life.

The need for carbide stabilization was recognized promptly and methods of accomplishing this objective by the use of such stabilizing elements as titanium or columbium were developed. These methods are described below in detail and are more than amply satisfactory in all but a few isolated instances.

Preventing Intergranular Corrosion

Focus of attention in preventing intergranular corrosion has always been on the carbon content in the steel as well as on its form. This is important because, as discussed below, one carbon atom combines with four chromium atoms to form Cr₄C. Hence only a small amount of carbon is sufficient to remove large amounts of chromium from solid solution at the grain boundaries where the carbide is

precipitated under proper temperature conditions. The grain boundary precipitation is a natural consequence of the fact that normal 18-8 is a hyper-eutectoid steel. As a result of this carbide formation the chromium content in the vicinity of the grain boundaries is sufficiently reduced so that the steel is not as stainless in this region as in adjacent regions, therefore resulting in intergranular corrosion.

The most favorable temperature for chromium carbide formation is about 1200°F and is called the "sensitizing" temperature. This is not to be construed that sensitization does not occur at higher or lower temperatures. The temperature mentioned is merely the temperature when sensitization is generally most rapid and is most commonly employed.

When carbide precipitation was recognized as the cause of intergranular corrosion, efforts were made to lower the carbon content and prevent its combining with chromium. Three principal approaches to this problem can be summarized as follows:

- (1) Minimizing the effects of carbon by; (a) reducing total amount present, (b) taking it into solid solution by annealing above 1800°F followed by rapid cooling to prevent its reprecipitation, (c) cold working to provide for subsequent precipitation of carbides on slip planes rather than grain boundaries.
- (2) Modifying the analysis in order to increase the amount of delta ferrite present.
- (3) Using an addition agent to form an inert compound of carbon which will be more stable chemically than the chromium carbide. Titanium was the first to be used for this purpose, beginning about 15 yr ago. Its introduction was soon followed by columbium.^{13, 29} Both of these elements are referred

TABLE II

Mechanical Properties of Wrought 18-8 Columbium-Stabilized Steel

CHEMICAL COMPOSITION, Pct							ASTM Designation.....		A 167-42	A 240-42
Carbon.....	0.10 max	Silicon.....	0.75 max				ASTM Grade.....	6	C	
Manganese.....	2.00 max	Chromium.....	18.00 min				AISI Type Number.....	347	347 is similar to grade C	
Phosphorus.....	0.035 max	Nickel.....	8 min				Structure.....	Austenitic	Austenitic	
Sulfur.....	0.03 max	Columbium.....	10 × C min							

MECHANICAL PROPERTIES														
Form and Treatment	Tensile Strength, Psi	Yield Strength (0.2 pct offset), Psi	Yield Point,* Psi	Proportional Limit, Psi	Elongation in 2 in., Pct	Reduction of Area, Pct	Impact Resistance, ft-lb		Hardness Number		Endurance Limit (Fatigue), Psi	Cold Bend, Deg	Ductility	
							Charpy	Izod	Brinell (3000-kg load, 10-mm ball)	Rockwell			Erichsen Value, Mm	Olsen Value, In
Sheet:														
Cold-rolled.....														
Annealed.....	90,000 ^b		40,000		50					B85		180	12	0.400 to 0.475
Strip:														
Cold-rolled (20 pct.).....	132,000 ^b	102,000			23									
Cold-rolled (30 pct.).....	152,000 ^b	125,000			10									
Annealed.....	90,000 ^b		38,000		50					B85		180	12	
Wire:														
Cold-drawn (20 pct.).....	100,000	90,000		40,000	23					C20				
Cold-drawn (40 pct.).....	145,000	130,000		70,000	10					C32				
Cold-drawn (60 pct.).....	190,000	175,000		95,000	4					C37				
Annealed.....	90,000	30,000		20,000	55					B85		180		
Plate:														
Annealed.....	90,000		37,000		50	60		100	170			180		
Tubing:														
Cold-drawn.....														
Annealed.....	90,000		40,000		50	60		100	170					
Bars:														
Cold-drawn.....														
Annealed.....	90,000		40,000		50	60		100	170			180		

* Yield point as determined with dividers must not be confused with a defined yield point strength, such as, at 0.2 pct offset.
b This is a representative and not a minimum value.

to as stabilizers and when added to 18-8 stainless steels the resultant product is termed a stabilized stainless steel.

Each of the above methods can be employed but all of them have certain commercial advantages and limitations and accordingly the general practice, when both heat and corrosion are involved, is to prevent intergranular carbide precipitation by stabilization with titanium or columbium.

Prevention of Intergranular Corrosion by Minimizing the Effects of Carbon—It was soon realized that the original Krupp compositions²⁰ were not suitable because of the high carbon content. Accordingly the basic composition was repatented¹⁴ at 0.07 pct max C and was described as being immune to intergranular attack. At that time the latter composition was not particularly commercial because of the unavailability of low-carbon ferrochrome. By the time the ferroalloy picture became favorable, commercially severe tests revealed that steels of 0.07 pct max C content were not immune to intergranular attack.

Hubbell¹¹ states that carbon "possibly up 0.04 pct can be tolerated without fear of intergranular attack by exhaust gases." He feels, and the writer concurs, that chemical service is a more severe application, and it is very doubtful that 0.04 pct C would be low enough, particularly if sensitization were prolonged. A recent U. S. patentee¹⁵ claimed a maximum of 0.030 pct C as being necessary "if intergranular corrosion is to be avoided to a satisfactory degree." Bain, Aborn and Rutherford in their classical treatment of the subject³ defined 0.02 pct as the limiting solubility of carbon in austenitic 18-8 steel.

In view of the difficulty and expense involved in reaching low carbon of 0.07 pct or less, other means were sought to utilize 18-8 steels with moderate amounts of carbon (i.e., around 0.07 to 0.12 pct). Several ingenious methods were proposed,¹⁶ each aimed at redistributing or changing the chromium carbide precipitation from its normal mode of continuous occurrence at the grain boundaries. This was accomplished by providing cold work slip planes as nuclei for precipitation or by producing a fine grained structure with a large extent of grain boundaries by low, hot-work finishing temperatures. Obviously these methods had certain limitations, particularly if considerable heating occurred, such as in welding.

Prevention of Intergranular Corrosion by Modification of the Analysis—The second approach to the problem of carbide precipitation was principally directed to an adjustment of the composition to produce delta ferrite. This was accomplished partially by balancing the composition within the range for 18-8 by aiming for high chromium, low nickel and low carbon. Alternatively, an addition of silicon in an amount equal to about 15 times the carbon, or about 2 to 3 pct^{17, 18} was also proposed but not widely used.

Formation of delta ferrite is helpful because the precipitation of Cr₄C first occurs therein and in the discontinuous austenite-delta ferrite boundaries. Thus when brief sensitization occurs, this method may prove adequate, but at best is only partially satisfactory because a control of the required amounts of delta iron is uncertain and often introduces hot-working problems.

This process is difficult to use because of the diffi-

TABLE III
Mechanical Properties of Wrought, Low Carbon, 18-8 Stainless Steel

CHEMICAL COMPOSITION, Pct						ASTM Designation.....		A 167-42	A 240-42					
						ASTM Grade.....		3	S					
						AISI Type Number.....		304	304 is similar to grade S					
						Structure.....		Austenitic	Austenitic					
MECHANICAL PROPERTIES														
Form and Treatment	Tensile Strength, Psi	Yield Strength (0.2 pct offset), Psi	Yield Point, a Psi	Proportional Limit, Psi	Elongation in 2 in., Pct	Reduction of Area, Pct	Impact Resistance, ft-lb		Hardness Number		Endurance Limit (Fatigue), Psi	Cold Bend, Deg	Ductility	
							Charpy	Izod	Brinell (3000-kg load, 10-mm ball)	Rockwell			Erichsen Value, Mm	Olsen Value, In
Sheet:														
Cold rolled														
Annealed	85,000 ^b		35,000		60					B80	35,000	180	10 to 14	0.4 to 0.5
Strip:														
Cold-rolled														
Annealed	90,000 ^b		40,000		50					B80		180	10 to 14	0.4 to 0.5
Wire:														
(20 pct.)	140,000	105,000		40,000	25					C32				
Cold-drawn	195,000	165,000		60,000	10					C40				
(40 pct.)	250,000	225,000		100,000	5					C45				
(60 pct.)	105,000	30,000		20,000	55					B80		180		
Plate:														
Annealed	85,000		35,000		60	65	100	150		B80	35,000	180		
Tubing:														
Cold-drawn	150,000		110,000		10			280		C30				
(Half hard)	185,000		140,000		5			325		C35				
Annealed	85,000		35,000		60	65	80	100	150	B80	35,000	180		
Bars:														
Cold-drawn, 25 pct.	150,000		120,000		20		48	320				180		
Annealed	85,000	30,000	40,000		60	70	90	160		B80	34,000	180		

^a Yield point as determined with dividers must not be confused with a defined yield point strength, such as, at 0.2 pct offset.
^b This is a representative and not a minimum value.

culty of controlling chemistry from heat to heat to obtain reasonably controlled amounts of delta ferrite. For a given heat there are further variations if the heat is rolled to markedly variable finished sizes.

Prevention of Intergranular Corrosion by the Addition of Titanium or Columbium—The third method of solving the problem of carbide precipitation was aimed at the use of an additional element which would form a more chemically stable carbide than chromium. Almost every element known to form a carbide has been proposed, yet commercial experience has shown only titanium or columbium to be adequately effective. Elements proposed include columbium, molybdenum, silicon, tantalum, titanium, vanadium, tungsten, zirconium, and others. Several authorities believe that some of these elements are helpful because of their formation of delta iron rather than their formation of stable carbides.

Behavior of Titanium

Chemical compositions and properties of 18-8 Ti, 18-8 Cb and low carbon 18-8 respectively are shown in tables I, II, and III²² (reproduced by permission of ASTM). It will be noted that each of the stabilizing elements, titanium and columbium, are added in proportion to the carbon content of the steel. The expression in tables I and II "Ti4 x C min" or "Cb 10 x C min" means that the total titanium or columbium present should be at least equal to 4 times or 10 times the carbon respectively.

For purposes of clarity a further explanation of table I should be made. The ASTM specification "A 167-44" or Grade 5 calls for a 4:1 Ti:C ratio while the ASTM specification "A 240-42" or grade T calls for a 5:1 Ti:C ratio and 0.60 pct max Ti. Likewise in table II a clarification should be made: The Cb:C ratio shown as 10:1 has since been revised, under the Emergency Specifications, to an 8:1 ratio.

Most existing specifications call for either a 4:1 Ti:C ratio or a 5:1 ratio; however, it is believed that at least a 5:1 min ratio should be used for two reasons. First, a small amount of titanium is combined with oxygen and nitrogen rendering inactive some of the titanium required for carbon. Second, the use of heat treating temperatures above about 2050°F may dissolve some TiC and increase the susceptibility to intergranular carbide precipitation, lowering the corrosion resistance, particularly in severe service.

Assuming that all the titanium will combine with all the carbon, the minimum titanium required to form the compound TiC is in proportion to the respective atomic weights of these elements (47.90 to 12, or approximately 4:1). Fishel and Robinson have recently reported some confirming data in this connection.¹⁹

In commercial practice a thorough deoxidation of the metal bath is preferably made with aluminum before ferrotitanium additions, hence the amount of titanium present as the oxide is very low (about 0.01 to 0.02 pct).

The nitrogen present will probably replace an atomic equivalent of carbon from combination with titanium, and the nitrogen, though also low, may run between 0.02 to 0.03 pct. Because of these circumstances it is more logical to work to a ratio of 5:1 and not undertake to make difficult nitrogen determinations.

According to Hume-Rothery,²¹ titanium carbide and nitride form a series of solid solutions and ac-

cordingly, particles precipitated in steel are believed to consist of the solid solution mentioned. The compounds titanium cyanide or cyanonitride do not exist as such but rather as the solid solution indicated by Hume-Rothery. The formula could then be written Ti(C,N).

Generally the presence of these carbides is not deleterious except in a few cases such as those requiring a high surface finish. In this instance it has been found that stabilization with titanium or columbium yields a material not amenable to obtaining the high surface mentioned.

Stabilization with either titanium or columbium provides a material of a finer grain size after the normal annealing temperatures of 1900°F, or somewhat above, as compared to regular 18-8. Since these elements are used to fix carbon, which is a powerful austenite former, it follows that steels stabilized with titanium or columbium would have delta iron, if the composition were not adjusted by appropriate increase of nickel content. This nickel adjustment is the absolute minimum requirement and is somewhat further increased by virtue of the fact that there is usually a slight excess of the stabilizing elements, which elements are powerful ferrite formers, over that just necessary to combine with carbon.

In a few instances where it is necessary to have a hardness lower than that obtained with the standard 1900° to 1950° F anneal, it is customary to anneal at 2050°F. Under these circumstances 18-8 Ti with a combination on the low sides of the Ti/C and Cr specification, may develop some susceptibility to intergranular corrosion. This tendency also exists with 18-8 Cb, but to a smaller degree.

References

- ¹ B. Strauss, "Electrochemical Behavior of Non-Rusting Steels," *Stahl und Eisen*, 45, 1925, p. 1198.
- ² B. Strauss and J. Hinnuber, "Periodic Passivity of Chromium and Chromium Alloys, and the Influence of Temperature on Passivity Potentials," *Zeit. für Elekt.*, 34, 1928, p. 407.
- ³ E. C. Bain, R. H. Aborn and J. J. B. Rutherford, "The Nature and Prevention of Intergranular Corrosion in Austenitic Stainless Steels," *Trans. ASST*, 21, 1933, p. 481.
- ⁴ B. Strauss, H. Schottky and J. Hinnuber, "Carbide Precipitation upon Annealing Stainless, Nonmagnetic, Chromium Nickel Steel," *Zeit. anorg. allgem. Chem.*, 188, 1930, p. 309.
- ⁵ J. H. G. Monypenny, "Stainless Iron and Steel," John Wiley & Sons, Inc., New York.
- ⁶ E. Houdremont and P. Schafmeister, "Prevention of Intergranular Corrosion in 18-8," *Archiv. f.d. Eisenhüttenwesen*, 7, 1933-34, p. 187.
- ⁷ ASTM Technical Committee A10, Subcommittee VI.
- ⁸ W. B. Arness, "The Sodium Cyanide Metallographic Etch Test for Revealing Precipitated Carbides in the 18-8 Type Stainless Steels," *Trans. ASM* 1936, p. 701.
- ⁹ J. J. B. Rutherford and R. H. Aborn, "A Quantitative Method for the Estimation of Intercrystalline Corrosion in Austenitic Stainless Steels," *Trans. AIME*, 100, p. 293.
- ¹⁰ E. E. Thum, "The Book of Stainless Steels," ASM 1935.
- ¹¹ W. G. Hubbell, "Result of Stabilized Heat Treatment on Welded 18-8 Stainless," *THE IRON AGE*, June 21, 1945, p. 56.
- ¹² S. P. Watkins, "Practical Metallography of the Stainless Steels," *Metals and Alloys*, 13, 1941, pp. 30, 162, 288, 431.
- ¹³ ASM Handbook 1939, p. 722.
- ¹⁴ German Patent No. 561,160.
- ¹⁵ U. S. Patent to S. F. Urban No. 2,374,396.
- ¹⁶ U. S. Patents No. 2,027,554; 2,044,743; 2,073,901.
- ¹⁷ J. H. G. Monypenny, "Corrosion Resistant Steels for Chemical Plant," *Proc. Eng. Group; Soc. Chem. Ind.*, 20, 1938, p. 40.
- ¹⁸ H. Bull, "Rust-Free Steels and Intercrystalline Corrosion," *Sheet Metal Ind.*, 10, 1936, p. 251.
- ¹⁹ W. P. Fishel and B. Robinson, "Distribution of Carbon Between Titanium and Iron in Steels," *AIME Tech. Paper No.* 1763, Oct. 1944.
- ²⁰ U. S. Patents 1,316,817 and 1,339,378.
- ²¹ Hume-Rothery, et al, "The Carbide and Nitride Particles in Titanium Steels," *Jour. Iron & Steel Inst.*, 1942, p. 129.
- ²² ASTM Committee A10 Report: "Tables of Data on Chemical and Physical and Mechanical Properties of Wrought Corrosion Resisting and Heat Resisting Chromium and Chromium Nickel Steels," Dec. 1942.



FIG. 1—Weighing only 36 lb, this new aluminum pallet can sustain a load of 26,000 lb, and is a valuable shipping cost saver.

IMPORTANT savings can be effected by the use of palletized loads in the handling of materials. This was demonstrated so effectively during the war years that many suppliers were required to make shipments to the armed forces on standardized pallets, and Navy handling experts estimate that the savings in moving a shipment of 100 tons amount to 479 man-hr, according to data collected by Reynolds Metals Co. Each unit load, consisting of a pallet with its load, usually weighs a ton or more, and is handled as a single unit throughout all moving, loading, storing, unloading and similar operations. All handling can be done with a standard fork truck or other mechanical handling device, instead of by hand, and published records of performances by the Navy show loading and unloading of palletized shipments in as little as 0.5 man-hr per freight car.

Of course these results were obtained under ideal conditions. However, records over a period of time show normal expectancy for loading and unloading palletized shipments, including removal from or placement into storage, running from 8 to 15 tons of goods per man-hr. This compares with 1½ to 3 tons per man-hr normally obtained with nonpalletized shipments of the same goods. Handling experts, therefore, feel that it is conservative to say that labor savings of 50 pct or more can be obtained by nearly any shipper.

Aluminum Pallets

Cut Material

Handling Cost

Important savings in the shipping and handling of large quantities of goods are made possible by the introduction of a strong, light-weight aluminum pallet, described herein. The advantages of the unit load method of handling materials are pointed out in this article, together with an indication of the savings in handling and shipping costs

One limiting factor, however, that has tended to restrict the general application of palletizing, has been that of freight rates. At the present time, all pallets take the same freight rate as the goods they carry. Thus a carload of canned fruits and vegetables involves a charge of \$18.50 for the 36 pallets (at 100 lb each) on a typical shipment from New York to Chicago. The shipping charge on the same pallets would be \$51.00 if they carried clothing. Thus palletizing of lightweight goods that take a high freight rate involves an almost prohibitive shipping charge on the older type pallets themselves, and has had great influence in preventing the extension of the fork truck-pallet methods of handling materials to many shipping operations where it should be used.

It is evident that the full advantages obtainable from the unit load movement of goods on pallets can be had only when the goods stay on the same pallet throughout all movements from the end of the production line in the plant, to temporary storage in the plant, to shipping platform, through loading of freight car, freight car movement to warehouse, unloading and storage at warehouse, and subsequent movement from warehouse to jobber, and finally to retailer.

Obviously, the right type of pallet is essential to obtain the full benefits of unit load movement to reduce loading and unloading costs, and in shortening turnaround time for freight cars and highway trucks.



FIG. 2—Top view of Reynolds all-aluminum pallet showing upper deck with corrugated surface sheet. Overhang at each end permits the use of a safety bar sling when hoisting loads aboard ship.

The development by Reynolds Metals Co. of standardized aluminum pallets for use in handling goods where continued movement is involved, is an important step in permitting the advantages of unit load handling to be extended to shipments over freight and truck lines. Also they are of value in subsequent movements through warehouse, to jobber and large retailer if the material is not long inactive, and since the Reynolds 40 x 48-in. aluminum pallet weighs 36 lb compared with about 100 lb for same size pallets made of other materials, shipping on aluminum pallets saves freight charges on 64 lb per pallet.

As an example of the cost savings thus realized, it may be pointed out that the cost of sending a certain type of palletized goods from Detroit to Louisville, a typical rail movement (400 miles), is \$1.00 per 100 lb or 1¢ a lb. Since the aluminum pallet weighs only 36 lb against 100 lb for other pallets, a saving of 64¢ per pallet is obtained on the outgoing shipment.

Return shipment of the standard pallets, is at rate of 36¢ per 100 lb. A regular freight car will hold 540 pallets, either wood or aluminum. This means a carload of wood pallets weighing 54,000 lb would cost \$194.40, or 36¢ per pallet.

On the other hand, a carload of aluminum pallets would weigh only 19,400 lb. But minimum carload weight is 30,000 lb so freight charge would be based



FIG. 3—View of underside of pallet showing large bearing area of lower stringers and rigid tubular separators. Corners of upper deck are reinforced with solid aluminum blocks.

on that weight, which would mean a cost of \$108.00 per car, or 20¢ per pallet. This represents a saving of 16¢ per pallet on the return trip. Aluminum pallets thus save 64¢ each going out, plus 16¢ each on the return shipment, or 80¢ per trip.

Aluminum pallets can impart no odors to their loads because they absorb none, being impervious to food smells, grease or dirt. In food handling, this is important because it means that the pallet can be loaded with fish, soap chips or bread, without discrimination as to subsequent or previous loads. They also present added safety factors since they are nonsparking and noncombustible. Also even when badly worn, there are no splinters or sharp edges to form a hazard.

These aluminum pallets are designed so the forks of the truck may enter the pallet from any one of the four sides or any of the four corners. This added feature means that such a pallet can be set down from one direction and picked up from another, affording added flexibility in stowing and removing stows. Also less space is required for maneuvering the truck since it need only make a 45° turn from an aisle to enter the pallet from the corner. Too, steel straps can be used lengthwise as well as crosswise on such pallets, providing stronger unit loads.

Made of newly developed high-strength aluminum alloys, the Reynolds pallet has withstood loads up to 26,000 lb without damage. Overload tests reveal no functional disorder right up to point of actual destruction. A rigid, welded, one-piece lower deck is securely riveted to the upper deck through tubular load carrying members, as shown in fig. 1. The same alloys that provide the high strength also insure against damage from rough handling. Also the design is reinforced at points most susceptible to damage.

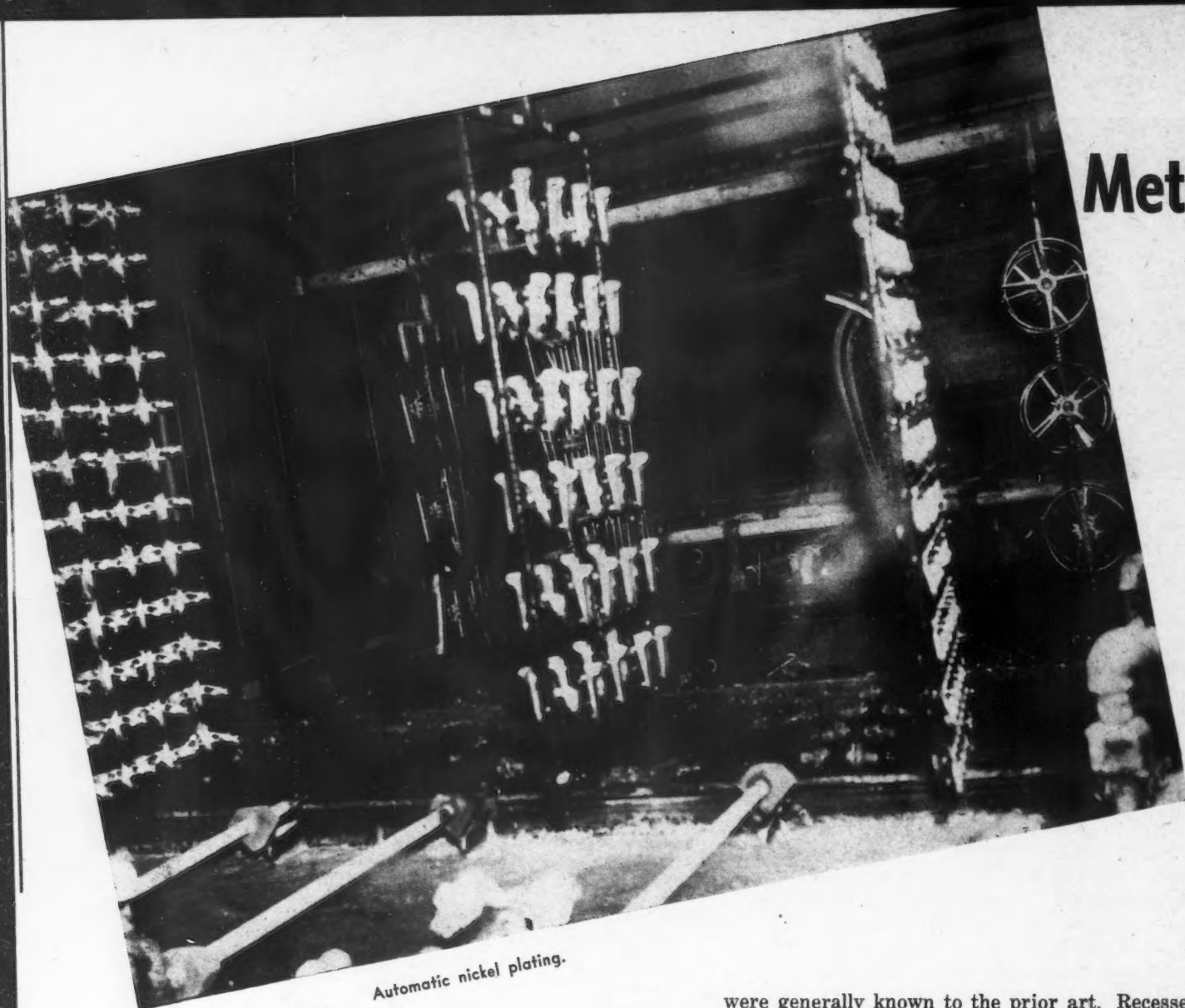
A typical design employs an upper deck made of two sheets of 52S $\frac{3}{4}$ H aluminum alloy stock, the topsheet being 0.051 in. thick, the bottom 0.04 in. thick. These sheets carry square ribs formed in them, each rib being 0.5 in. deep and 1 in. wide. Ribs in the top sheet are crosswise of the pallet, those in lower sheet being lengthwise. Top and bottom sheets are joined by spot welds at many points.

Lower deck or bottom stringers, as shown in fig. 2, are 52S $\frac{1}{2}$ H alloy, 0.064 in. thick formed into channels for added strength, with corners forming the framework joined by 45° butt welds. Stringers 4 in. wide provide adequate bearing surface for tiering almost any load. A $3\frac{3}{4}$ -in. clearance between upper and lower deck is provided by drawn aluminum cups which act as structural columns to form a strong assembly. Eight 2 $\frac{1}{2}$ -in. diam cups made from 52S $\frac{3}{4}$ H alloy 0.051 in. thick are used as spacers at corners and midpoints. A 6-in. diam cup of 52S $\frac{1}{2}$ H alloy 0.064 in. thick is used as the central column. The curved surface of the spacers also helps guide the forks into place when engaging the pallet.

The above elements are assembled to form the completed pallet by building up from the lower deck. Explosive rivets through the bottom of the cups into the lower deck securely join those parts. Then the upper deck is riveted to flanges around the top of the cups. A 1 $\frac{1}{2}$ -in. square piece of aluminum bar stock, 1 in. thick, is used between top and bottom sheets of the upper deck at the corners to provide added reinforcement at those points. Rivets here go entirely through top and bottom sheets as well as the reinforcing block. The upper deck overhangs the lower at both ends by 2 $\frac{1}{2}$ in. for attaching a safety bar sling for handling aboard ships.

Metal

Fin



Automatic nickel plating.

Practical Aspects of Electroplating

By C. L. FAUST

MANY postwar reconversion problems and shortages lead to opportunities for using electropolishing effectively and economically. There are shortages of polishing and buffing wheels, and, even more critical, there are few good polishers and buffers available.

Electropolishing is now a commercial process for surfacing, machining, or finishing metals, either to

Additional abstracts of papers presented at the AES meeting were published in THE IRON AGE, July 25, 1946, p. 58. Subjects covered in that report included alkaline electroplating, coloring magnesium alloys, liquid polishing and buffing compounds and X ray diffraction studies of electrodeposits.

provide a brilliant surface appearance, or to achieve machining without cold working or heat effects, and the attendant distortions that accompany mechanical metal-finishing methods.

An outstanding advantage is the production of brilliant color having exceptionally attractive tone not previously seen on many metals in simple and in complicated shapes. Metal is removed under highly polarized and pseudopassive conditions, which do not prevail in the simple, electrolytic cleaning treatments that

were generally known to the prior art. Recessed surface areas are polished as well as relief areas. This effect, along with the exceptional color tone that results, provides outstanding advantages.

However, the same effect reacts against the process in certain applications. Being electrolytic, the process is dependent on surface smoothness and on the physical and mechanical nature, and the "inherent cleanliness" of metal from any method of fabrication. Seams, dirt, slag and nonmetallic inclusions, deep rolling or drawing lines and certain insoluble phases in alloys are uncovered and may or may not be removed.

At the present time, evaluation of practical application generally originates from a desire to replace hand polishing and buffing. This attempt too frequently fails because proper considerations have not gone into the thinking. One must recognize and immediately accept the fact that *there is no electrolytic wheel finish*. The method does not have the cutting and burnishing action of wheels and tumbling barrels. It can never produce the same finish. It is obvious, then, that there are applications where mechanical polishing cannot be replaced by electropolishing. Where the burnished appearance of a wheel-colored surface is required because of custom and habit, a combination of electropolishing plus a light wipe on a coloring wheel accomplishes the result with less over-all effort.

Many automatic and hand-operated machines, now in use for different kinds of metal surfacing operations, can be replaced or complemented. Among these are: Machining to exact size, removing of burrs from stamped, ground, punched, drilled edges, etc.; surface

Finishing Methods Discussed . . .

preparation by polishing and buffing before final finishing by electroplating, painting, lacquering, japanning, enameling, etc.

In determining the value of the process for a number of applications, a variety of products from many different companies have been studied. These have included a wide variety of automotive, aircraft, ordnance items, hardware, jewelry, chemical apparatus, tools, household equipment and other products.

Irregularities become apparent in relatively flat surfaces, but not in contoured surfaces or in those broken by design. For best results by electropolishing, stampings must be made from good quality clean metal in cold-rolled sheet or strip from clean rolls, providing essentially complete reduction of pickle pits and imprints from previous hot-rolling stages. Surface dents and imperfections should not exceed the magnitude of a scratch from a well dressed 180-grit wheel. Orange peel and sandcast surface roughness cannot be eliminated by a practical amount of electropolishing.

Electropolishing can be accomplished only by metal removal which consumes chemicals. Costs are based on direct charges such as for plating costs. From present information there is no reason to believe that electropolishing will be either cheaper or more expensive than mechanical polishing and buffing. Mechanical polishing consumes wheels, materials, and, in most cases, more manhours.

For breadth of technical applicability, perchloric-acetic acid baths are outstanding. More metals can be polished with these acids than with any others. Current density range is wide, but tank voltage is very high, rates are slow, and there is a known explosive hazard. Nevertheless, commercial installations have been considered and operated in at least one case.

Baths of phosphoric-chromic acid have almost as universal a polishing nature as the perchloric-acetic baths. They are lower in cost than the latter, but have relatively high cost compared with those mentioned in the following paragraphs. Brass, nickel, copper, stainless steel, steel and zinc can be electropolished under practicable conditions. Except for brass and zinc, these metals and many of their alloys are more economically polished in other solutions.

For practical applicability, sulfuric-phosphoric acid baths are the most useful and in widest commercial application for stainless steels, carbon steels, low-alloy steels, nickel, Monel, nickel-silver, wrought aluminum and aluminum alloys.

Stainless steels are also electropolished commercially in sulfuric-citric acid and in plain phosphoric acid baths. Fluoride and alkaline solutions are in use for aluminum.

Specific local installations have been developed for baths using phosphoric-acetic, phosphoric-glycerine, phosphoric-alcohol or glycol, and sulfuric.

Wrought and cast stainless steel alloys are expensive to polish mechanically, but are easily brought to

Among the many phases of metal finishing discussed at the annual convention of the American Electroplaters' Society, held recently at Pittsburgh, were the practical aspects of electropolishing, nickel plating on steel by chemical reduction and disposing of plating room waste liquors. Extended abstracts of papers covering these subjects are presented herewith.

high luster electrolytically. For economic electropolishing to good appearance, strip, sheet and wire must be reasonably smooth to start with.

Castings, as they come from the mold, must be pickled to remove scale and then have parting lines, gates, and projections removed. Although very brilliant after electropolishing, the surface texture will be that of the mold surface.

Carbon steels and alloy steels are electropolished for machining, for burr removal, and in preparation for plating, painting, and vitreous enameling. Low-carbon steels, such as SAE 1010 and 1020, can be smoothened and made very lustrous by electropolishing, but not to the degree attained with stainless steel. Generally, the appearance is not improved because of the nonmetallic inclusions, seams, orange peel, etc. No. 1 cold-rolled steel can be stamped, and formed, then electropolished to shorten hand polishing to one coloring wheel. Better practice is to use No. 3 high-quality cold-rolled steel, blank, form, and either copper or nickel plate, then electrobuff the plate.

SAE 1040, 1060, 1085, 4130, 4140, 5110 nitralloy, nitrided steels, and carburized steels electropolish to high luster. The principal advantage is for surface preparation before plating for engineering purposes where strong bonds are required. Since surface stresses are removed and nonmetallics cleaned out, improvement can be obtained in corrosion protection offered by plated coatings.

Chromium, bright nickel, bright copper and other metals can be electrodeposited, using commercial methods immediately after the rinse following electropolishing. Adherence is excellent. In fact, bright cold-rolled steel that is electropolished for 15 sec can be bright nickel plated directly after rinsing. No successful methods for electropolishing wrought iron and cast iron have come to the author's attention.

For decorative finishing, electropolishing of bright nickel plate offers outstanding possibilities. Purity and structure control of the metal to be electropolished is then in the hands of the finishing department. If surface defects in the basis metal are kept to a magnitude not exceeding that of a scratch from 180-grit polishing wheels, satisfactory appearance is realized by applying an excess plate thickness of 0.0001 in. to 0.0005 in. Electrobuffing gives additional hiding as

well as color insurance for occasions when the brighteners are slightly out of balance.

There are at least two practical methods. The 63 pct sulfuric acid solution is operated at 250 to 560 amp per sq ft at 85° to 140°F. Broader operating ranges and less critical control are required of 15 pct sulfuric—63 pct phosphoric acid solutions.

Bright copper and semibright copper plate are electrobuffed in shorter time and with more favorable results than matte copper as from the acid copper-sulfate bath. Exceptional results can be obtained by applying an extra 0.0002 in. to 0.0001 in. of plate and electrobuffing it off as means for supplanting hand polishing of basis metal and buffing of the plate. After electrobuffing copper plate, 0.0002 in. of bright nickel plate is needed before chromium plating for full color.

Wrought and cast copper are made very lustrous, but generally have a faint pebbly texture associated with the effect of relatively coarse structure. Oxides in the copper are particularly troublesome, and lead to pits or "peaks." Electropolished copper can receive Electrocolor to show exceptionally clear, rich color effects not attainable on wheel-buffed copper.

The best results of electropolishing brass are with cartridge brass and gilding metal (95-5) half hard, but all compositions of copper-zinc alloys from yellow to pure copper can be electropolished under the same conditions.

Monel and nickel silver are polished with commercial facility in sulfuric acid—phosphoric acid bath used for nickel. Slightly higher current density is required. General factors relating to sheet, strip, castings, etc., also pertain.

Mirror-like finishes of exceptional light reflectivity are commercially produced on aluminum. Sulfuric-phosphoric-chromic acid baths will electropolish such wrought aluminum as 2S, 3S, 14S, 24S, 51S, 53S 64S. Electropolished aluminum acquires an unusually rich color tone when anodized and dyed afterward.

Commercial electropolishing of zinc and zinc die castings has not come to the author's attention. Polishing of electrogalvanized wire and thin strip should be commercially interesting and practical. Brilliant, mirror-like finishes are produced on pure zinc and zinc plate in caustic solutions, caustic-cyanide solutions, chromic-phosphoric acid, and perchloric-acetic acid solutions. Several of these methods are commercially feasible, but very little interest has been shown by producers or fabricators for polishing pure zinc.

Cadmium can be electropolished in acid solutions that are under development now, but which are still in the laboratory stage. The only potential application now visible is for brightening plates. A chemical polishing bath for cadmium plate is reported, based on acetic acid-iodide solution.

All platers from time to time have noticed periodic voltage fluctuations in the silver tank and have seen bright anodes result.¹ There are recent publications on polishing silver in cyanide baths but the method is slow. No reference has been found to electropolishing sterling silver.

Lead, tin and their alloys are electropolished in perchloric-acetic acid solution for metallographic examinations. No commercial application has been recorded to date.

Pure magnesium can be electropolished to mirror-like appearance in phosphoric-chromic acid solution,

¹ See "New Method for Polishing Silver Plate," THE IRON AGE, June 6, 1946, p. 65.

but there is practically no application for it. Die castings do not respond to the same conditions as the pure metal and satisfactory procedures apparently have not yet been developed.

Electropolishing accomplishes some passivation of all metals to provide improvement in tarnish resistance. The most outstanding benefits are found with the stainless steels, which are much improved over the condition given by customary nitric acid passivation.

For industrial operation, a polishing tank and two warm rinses are required along with the necessary auxiliary equipment such as cleaner (preferably solvent and vapor method), scale remover, racks, etc., as used for plating. Electropolishing racks must be built to carry higher currents than normally used for plating (except chromium). Rack costs are approximately two to three times those for plating. Equipment life otherwise is figured about the same. Promising results have been obtained for barrel polishing copper plate on parts which are barrel plated.

Chemical lead-lined equipment is most widely used. Certain synthetic resins, such as Polythene, Saran, and Koroseal are resistant to many of the baths in commercial use at temperatures below the softening point.

Provision for heating and cooling is desirable for the polishing tank where the current usually is under 10 amp per gal and preferably 5 amp per gal or less, in order to maintain low voltage and temperature without heavy cooling.

The cost of electropolishing a metal cannot be expressed in a few paragraphs any more than can the cost of electroplating a metal. Tanks, equipment, direct-current machines, bus bar, auxiliaries, etc., are the same as those for plating, so investment costs, fixed charges, etc., are similar. Polishing solutions have greater weight per gallon, so tanks must be stronger. Tank loads to meet production requirements and current of 5 amp per gal make it simple to figure tank sizes and tank current.

Materials are consumed during electropolishing. Metal is removed from the work, generally equivalent to 0.0001 in. to 0.001 in. in thickness. This metal dissolves in the bath and must be removed from it. Otherwise, the bath ceases to electropolish when it becomes saturated with metal.

TABLE I
Typical Bath Formulas

Bath	1	2	3
Nickel chloride, NiCl ₂ · 6H ₂ O*	30	30	30
Sodium hypophosphite, NaH ₂ PO ₂ *	10	10	10
Ammonium chloride, NH ₄ Cl*	50	100	.....
Sodium citrate, Na ₃ C ₆ H ₅ O ₇ · 5½ H ₂ O	100	.....	100
Rate of deposition, mm per hr.	0.006	0.012	0.005
in. per hr.	0.00025	0.0005	0.0002
Appearance of deposit	semi- bright	dull	bright
Alkali for neutralizing bath	NH ₄ OH	NH ₄ OH	NaOH
pH	8 to 9	8 to 9	8 to 9

* 9 rows per liter. •

Some electropolishing baths have a definite life dependent on saturating the bath with the metal dissolved from the work. This life, then, is fixed by the amount of metal that is removed from the products being treated. Other electropolishing solutions have infinitely long operating life. Losses from them amount solely to drag-out. Baths are commercially available for electropolishing copper and nickel which are maintained in a state of equilibrium during operation, because they plate metals on the cathode at the same rate the metal is dissolved from the work. This cathode metal thus becomes recoverable and can be credited to the process. Other solutions, and these include ones for stainless steel, have relatively long life because they precipitate metal salts from the solution. These salts are removed from time to time, and acids lost in the salts and those lost by drag-out are replaced to maintain operating control.

Tank voltages are generally higher for electropolishing than for plating. Since current densities are higher, electric energy consumption is greater. Cost of chemicals, current density range, tank voltage, stability of the bath, breadth of applicability, etc., determine which electropolishing process will be most economical.

Equipment life and maintenance costs are about the

same as for plating. In some cases (stainless steel, steel, nickel polishing) rack costs are less than they are for plating. In others, rack costs run two to three times higher. Other costs, such as labor charge for racking and unracking, tank operation, and control are approximately the same as for plating. The direct charges, such as for electrical energy and chemicals, are specifically related to the time of electropolishing, the current, the tank voltage, and the particular bath used.

On a very approximate basis, costs per square foot for electropolishing will be on the order of the following: Stainless steel—5-min polishing, 2 to 5¢; 10-min, 5 to 12¢; carbon and low-alloy steel—not so directly related to time (5 to 30 min polishing should be in the range of 0.1 to 15¢, regardless of time); aluminum—2 to 15 min polishing should be in the range of 2 to 25¢; brass—5 to 15 min polishing should be in the range of 5 to 25¢; nickel—1 to 7 min electropolishing, 0.1 to 15¢; copper—1 to 15 min electropolishing, 0.1 to 20¢. Unit costs can be obtained, also approximately, according to the number of parts per square foot of surface polished.

The important conclusion is that electropolishing applications must be tailor-fit. Thus costs must be specifically evaluated for each case.

Nickel Plating on Steel by Chemical Reduction

By ABNER BRENNER and GRACE E. RIDDELL

National Bureau of Standards, Washington

A PROCESS has been developed for the production of adherent nickel deposits, of good quality, on steel without the use of an electric current. Deposition of nickel is brought about by chemical reduction of a nickel salt with hypophosphites in a hot ammoniacal solution. The reaction is catalytic and, under the prescribed conditions of concentration and pH, no reduction occurs in the solution unless certain metals such as steel or nickel are introduced into the bath. The reduction then occurs only at the surface of the immersed metal with the production of a coating of nickel of 96 to 97 pct purity.

An adherent compact nickel coating can be deposited on certain metal surfaces immersed in the bath, without any appreciable precipitation of nickel occurring throughout the bulk of the solution or on the walls of the glass vessel, by employing dilute solutions of hypophosphite, about 10 g per liter. Under these conditions the deposition of nickel occurs on the surface

of iron, nickel, gold, cobalt, palladium, and aluminum, but not on platinum, copper, zinc or lead.

The composition of the baths may vary within wide limits. Some typical formulas are shown in table I.

The baths are operated at or above 194°F. In the absence of those metals which catalyze nickel deposition, the baths are fairly stable. A bath containing hypophosphite has been kept at 194°F for 5 hr without deteriorating very much. At room temperature a bath is stable for several days.

Bath No. 1, table I, is the preferred composition. Bath No. 2, which does not contain any nitrate, plates more rapidly than bath No. 1, but the deposits are dull and more likely to be rough, and the bath does not remain as clear during operation. Bath No. 3, with no ammonium salts, gives the brightest deposits, but had the disadvantage that after the deposits had reached a thickness of about 0.0002 in., they ceased to become thicker even after several hours.

Disposing of Plating Room Waste Liquors

By C. J. LEWIS,

Warner Co.

STREAM pollution is of interest to the electroplating industry because of plating room wastes. These wastes fall under the general headings of acids, alkalis, cyanides and heavy metals. To these we might add another classification known as "miscellaneous." All of these materials are potentially objectionable under the present stream pollution laws of the various states. Although in most electroplating establish-

ments their total volume is relatively small, these wastes are apt to attract attention because of the intensified stream pollution programs now under way or about to get under way throughout the nation.

As a general rule, stream pollution laws are applicable to the discharge of the objectionable material rather than to its production or cause. Broadly interpreted, this means that the water from an electroplat-

ing plant discharging directly into a stream will be under state observation, but those plating room wastes being discharged into a municipal sewer system will usually be evaluated by municipal authorities. However, since the effluent from sewage-treating plants eventually comes under state inspection where it enters stream or water courses, states will probably reserve the right to regulate industrial waste discharge into municipal sewer systems if local measures are ineffective. The Pennsylvania pollution laws are specific on this point.

Because of the enormously high toxicity of the cyanides to aquatic life in particular; because of the biochemical difficulties caused by small amounts of cyanide, chromate and iron in primary sewage treatment; and because of the biological problem caused by minute quantities of cyanide, chromate, copper and other heavy metals in secondary sewage treatment, it is very likely that as stream pollution programs develop, even modest quantities of plating room wastes will require at least some form of chemical treatment prior to discharge.

Apparently there is no generally accepted method for plating room waste disposal. Each situation involving waste disposal must be evaluated on its own merits. Acids and alkalis respond to relatively simple waste treatment procedures. Neutralization with soda ash in the case of acids or with sulfuric acid in the case of alkalis or even through combination of the waste acids and alkalis themselves will in most cases produce neutral salts, the amount of which is usually not objectionable in the relatively small volume of plating room discharge. Precipitation of heavy metals such as zinc, cadmium, iron, tin, and copper with caustic or lime likewise may result in near neutral sludges which can be accepted into sewer systems in any case, and directly into streams in some instances. Copper itself may, of course, be removed by trickling the copper-bearing waste through steel wool, scrap iron or similar system for the plating out of the copper with the resulting solution of iron. Since iron is usually less objectionable than copper from the pollution angle, such treatment is often feasible.

Chromium creates a special problem. One method for treatment involves the use of scrap steel to reduce the chromium to the trivalent condition for subse-

quent neutralization and precipitation with lime or soda ash. Methods for the use of sulfur dioxide or ferrous sulfate to reduce the chromate, followed by soda ash or lime precipitation have been described. Barium sulfide has been used to directly precipitate some of the hexavalent content as barium chromate with the sulfide acting as a reducing agent on the remaining chromate, thus setting the stage for subsequent precipitation with lime.

Cyanides seem to present the most difficult disposal problem due not only to their extremely high toxicity to aquatic life but to the actual industrial hazard in coping with cyanide wastes. Some accepted methods for cyanide disposal involve the acidification of the waste with sulfuric acid which converts the cyanide to the volatile HCN gas, which in turn must be vented by safe methods. Another method is to treat the cyanide waste with ferrous sulfate, commonly known as copperas, to remove the cyanide from the solution as the insoluble Prussian Blue. Bleaching power reacted with cyanide under suitable conditions of high alkalinity substantially converts cyanide to the less toxic but soluble cyanate. Lime and sulfur boiled with cyanide converts to still less toxic but soluble thiocyanate. Lime treatment alone converts cyanides to ammonia.

Methods are known for the treatment of every type of plating room waste in terms of stream pollution requirements. However, it is usually impractical to segregate plating room wastes for separate treatment, depending upon their composition. There is as yet no approved treatment process which is universally applicable to a heterogeneous mixture of plating room wastes of changeable composition. Some form of lime treatment of combined plating room wastes appears to offer the most promising possibility. Lime or a comparable alkali treatment of combined plating room wastes will result in sludges which will probably require removal through filtration or centrifuging before the effluent will be acceptable into stream or sewer. Separated sludges will best be disposed of on a waste dump. Possible recovery of valuable byproducts from plating room wastes and their treatment by processes which may result in profit or even partially offset the cost of treatment, awaits development through planned research.

Stainless Pen Caps Drawn Without Annealing

PRODUCTION of stainless steel pen caps with a total reduction from blank diameters of 80.5 pct without annealing is reported by Eisen Metal Products Co., Hoboken, N. J. The accompanying illustration shows the cap in two stages of the drawing operation. The pen material is drawn in Allegheny metal deadsoft type 304 stainless strip 2 $\frac{5}{8}$ in. x 0.0105 in. The processing begins with an initial blank of 2.5 in. diam. The first shell is cut and drawn on a double action press and the shells are then hopper fed to another press, the latter containing eight stations. Product of the final draw is a thin-walled shell with a diameter of 0.488 in. and a height of 2.4375 in. From this the final pen cap is formed.



New Equipment...

Material Handling

Recent developments in loading and tiering, side-mounted motor and heavy duty industrial trucks, unloaders, and a trailer undercarriage are presented in this week's issue. Conveyors, hoists, hooks and grabs are among the smaller material handling units described in the review.

TO MAKE their 1000-lb hydraulic high-lift truck adaptable to higher stacking and tiering jobs, *Lyon-Raymond Corp.*, Greene, N. Y., has designed a telescopic frame which increases the elevated height of the platform to 84 in. In lowered position the overall height of 69 in. is maintained, allowing the truck to be moved through doorways and under overhead obstructions. The telescopic section is of the same tubular construction as the base frame, insuring that added weight is kept to a minimum. An auto-type steer, with wide-spread front wheels, is provided for increased stability. The truck is available with a hand or motor-driven pump.

Side-Mounted Motor Truck

PUTTING the motor on the side of the model LT-35 lift truck, *Towmotor Corp.*, 1230 E. 152nd St., Cleveland 10, has made lift truck operation possible, it is said, in areas previously inaccessible as the wheel base of the truck has been cut to 35 in. The model weighs only 2800 lb but is said to lift, carry and stack a 1500 or 2000-lb load in tight aisles, elevators, highway trucks and freight cars. Its comparatively lightweight also makes operations possible on 2-ton capacity elevators and in multi-story buildings with low to medium load limits. Lifting and tilting mechanisms are hydraulic.

Commutator Head

DEVELOPMENT of a commutator head featuring micaalex brush mountings that will not burn has been completed by the *Automatic Transportation Co.*, 149 W. 87th St., Chicago 20, for its platform and lift truck motors. The micaalex mountings cannot be damaged by arcing or by the heat of the motor, since micaalex combines the advantages of both Bakelite and

porcelain, yet eliminates the disadvantages of both, it is said. The commutator head has been engineered throughout for easy inspection and maintenance. It is so designed that motor leads, brush holders, brush springs and mountings can be inspected or replaced without dismantling the motor.

Unloader

COST reductions of as much as 50 pct in the loading phase of material handling have been reported in the use of the *Towmotor*



unloader designed for use with lift trucks of *Towmotor Corp.*, 1226 E. 152nd St., Cleveland 10. The unloader is hydraulically operated by the driver from his regular position. Two double acting hydraulic cylinders move the vertical rack forward, pushing the load off the forks. This device can be supplied for all sizes of *Towmotor* lift trucks and is said to be of particular value in the job of loading box cars, and with its pulling power to pull dies from a die bed or die rack onto the forks.

Ten-Ton Truck

A 10-TON capacity industrial truck, driven by means of storage batteries and electric motors has been announced by the

Elwell Parker Corp., Cleveland 14. Most notable features aside from compactness and power, include simplicity, instant responsiveness, ease in maneuvering, and quiet operation. The body of the truck is low, giving the operator complete visibility of platform, load and surroundings. Overall length is 147 in., width 45 in. It is steered by means of its six wheels, four of which are under the platform, and are said to insure stability of the load. It can turn in aisles 71 in. wide. Speed may be accelerated rapidly to 6 mph, while the truck can come to a dead stop within a few feet, it is said.

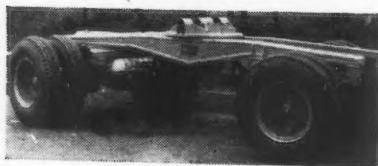
Loading and Tiering Truck

BY MEANS of a simple truck attachment designed by the *Elwell-Parker Electric Co.*, Cleveland 14, loading freight cars and transporting and tiering heavy, bulky objects anywhere in narrow aisles with right angle turns are said to be possible. One part of the attachment is a small turntable bolted to the truck's lower forks. This supports the load. An overhead fork is bolted to the lower fork's rear framework, and is adjustable for height of load. A chain extends from the outer end of the upper fork, and a hooked clamp on the end of the chain fits down over the edge of the load. When the slack in the chain is taken up the weight of the load tenses it and the load is held firmly in position. The turntable permits the load to be swiveled for maneuvering and the elevating mechanism enables the operator to double-tier crates without manual assistance.

Trailer Undercarriage

THE Hoobler undercarriage, a two-axled, self-steering unit for van, high-side, flat-top and tank semitrailers, has been announced by the *Union Metal Mfg. Co.*, 1402

Maple Ave., N.E., Canton 5, Ohio. Attached to the underside of a semitrailer platform and linked to the tractor by two parallel tongues, the undercarriage follows the turn of the tractor without any separate steering. In addition, its front set of wheels operates independently, guiding the rear end of the trailer



in the path of the tractor without any assistance from the driver. There are no controls in the cab for the driver to manipulate. Equipped with the Hoobler undercarriage, 30 to 40-ft moving vans, tank trailers and other large commercial vehicles, it is claimed, can readily make a right turn from one 15-ft street into another 15-ft street. Due to this true-following technique, the new undercarriage eliminates tire scuffing, and the necessity to lash loads, it is said. Another advantage claimed for this undercarriage is that pay loads may be increased as much as 40 pct. The attachment is available for semitrailers in sizes from 28 ft in length and up.

Hand Truck

IMPROVEMENTS in the post-war Transporter have been designed by the *Automatic Transportation Co.*, 149 West 87th St., Chicago 20, to improve performance, increase the life, and minimize maintenance cost. A revolutionary hydraulic lift pump said to reduce by two-thirds the time necessary to get a load into moving position and a redesigned more powerful brake are outstanding new features. One stroke only is required to engage a loaded skid with standard 1-in. clearance, it is said. The pump's performance is achieved through combination of a low pressure cylinder for raising the platform into contact with skid or pallet and a high pressure cylinder for raising the load. The new pump is interchangeable with the old and can be installed on all Transporters now in service. The brake is applied automatically by release of the guide handle and is said to bring fully-loaded truck to an immediate stop even on grades up to 10 pct. The motor and driving units have been redesigned. The new Trans-

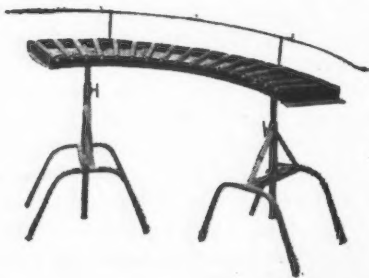
porter is made in four models: 4000 and 6000-lb capacity platform types for skid platforms; 4000-lb capacity fork type for pallet loads; and a special 3000-lb capacity fork model for tinplate. In addition, the Transtractor, a new push-pull unit, uses the Transporter power unit and incorporates the same improvements.

Load Cart

ANNOUNCEMENT of a newly designed load cart has been made by the *Market Forge Co.*, Garvey St., Everett 49, Mass. The cart is particularly useful for handling coal, sand, ashes, cement, bricks, steel stampings and similar aggregates as the height of the truck from the floor makes it convenient for shoveling materials in or out. The unit is furnished with 16-in. diam pneumatic rubber tires making it serviceable for traversing poor floors or for use in outdoor areas. The drop side of the truck can be locked in closed, half-open, or fully opened position. Specially designed hinges eliminate the usual troublesome crevice between the drop side and the bottom of the truck. Capacity of the truck when handling such materials as coal is approximately 1000 lb. Volume is 22½ cu ft. Semisteel or cushion rubber wheels are also available. Fifth wheel steering is furnished. Models can also be furnished with drop side on the opposite side of truck or with two drop sides.

Gravity Conveyors

TWO light duty gravity conveyors have been announced by the *Island Equipment Corp.*, 101 Park Ave., New York 17. The one,

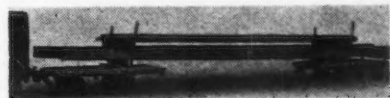


known as the Jack Knife gravity conveyor, is an assembled unit, where legs and conveyor are in one. The legs can be raised or lowered from 6 to 52-in. height by loosening two wing bolts. One end can be made lower than the other, giving greater or less pitch to the

table top. The second model, illustrated, features several innovations giving it greater range in use and adaptation. One is the unique bearing employed, making more effective the carrying efficiency of the conveyor. Two types of leg supports, single or double post, are supplied. Units are supplied in various lengths, capable of being coupled for conveying straightaway and around curves.

Swivel Bolster

DEVELOPED for handling unusually long loads of steel



rods or beams, timber or other materials, the swivel bolster has been manufactured by the *Mercury Mfg. Co.*, 4144 S. Halsted St., Chicago 9. This device consists of two identical assemblies, each of which may be attached to a single castor steer trailer by inserting posts into side rack sockets, making it a simple matter to adjust regular handling equipment to carry loads of extraordinary length. Unwieldy cargoes may be moved through narrow doorways and aisles and around corners, the lead trailer pulled by a tractor or power vehicle, and the rear trailer guided manually.

Rapid-Roller Conveyor

MANUFACTURE of a rapid-roller gravity conveyor has been announced by the *Rapids-Standard Co., Inc.*, 108 Peoples National Bank Bldg., Grand Rapids 2, Mich., to solve handling problems where materials with insufficient flat area cannot be moved by wheel-type gravity conveyors. On the rapid-roller conveyor various types of irregular surfaced materials such as cans with chimes, kegs, light drums, cartons, crates, boxes, steel bars or long and narrow pieces of light lumber can move swiftly and easily along production lines. The conveyor is made to handle anything with one firm, free-running surface. Slightly declined sections of the conveyor will carry objects which are heavy enough to move along the rollers of their own weight, while level lines can be used for storage or to facilitate movement of merchandise by a slight manual push. Two

NEW EQUIPMENT

standard frame lengths of 5 and 10 ft in two standard widths of 12 and 18 in. are available.

Lightweight Conveyor

CALLED the Tote-All Zephyr, a lightweight portable conveyor for industry has been announced by *Material Movement Industries*, 310 S. Michigan Ave., Chicago 4. This power conveyor, made of corrosion and abrasion resistant alloy steel, is available in two lengths, 12 and 16 ft. Both models have an 8-in. belt. Power is furnished by a gasoline engine which is mounted above the conveyor, out of the way of dust, dirt and spillage. The engine mounting is adjustable to keep engine level at all conveyor positions. An electric motor is available or the conveyor may be purchased without a power unit. The 12-ft model weighs 135 lb. Said to be easily carried by one man from one job to another, the unit may be used for conveying bulk products such as sand, salt, coal, gravel, etc.

Portable Conveyor

PRODUCTION of a rust-proof, dust-proof, portable conveyor has been announced by the *E. W. Buschman Co.*, Cincinnati 32. Wheel treads and hubs are protected with a heavy zinc plate; side disks of the wheels are red baked enamel. A special inner seal is said to exclude water, dust, grit or other harmful foreign matter from the full ball bearing, insuring smooth operation and long life. The conveyor, furnished in standard line models, is interchangeable with the Buschman standard portable conveyor and accessories. Ten foot and 5-ft lengths are available as well as 90, 60, 45, and 30° curves with an inside radius of 2 ft 6 in. Standard adjustable tubular stands for supporting the conveyor, package stops and other accessories are available.

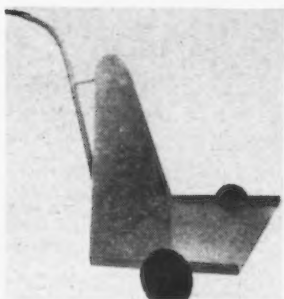
Plate Nose Hand Truck

ADDED to the Wheel-Ezy line by the *Rapids-Standard Co., Inc.*, 108 Peoples National Bank Bldg., Grand Rapids 2, Mich., is a plate nose hand truck for handling cases, kegs and bags. The arc-welded, one-piece frame provides a ruggedness that stands up under the severest conditions, it is claimed, and moves a 500-lb load with ease. A step climber feature

enables heavy loads to be moved up and down steps and curbs. General pneumatic wheels are used on the truck, which are said to eliminate danger of sparks, move loads easier, stop cargo spilling and breakage due to joltage, and to provide freer rolling.

Hand Truck

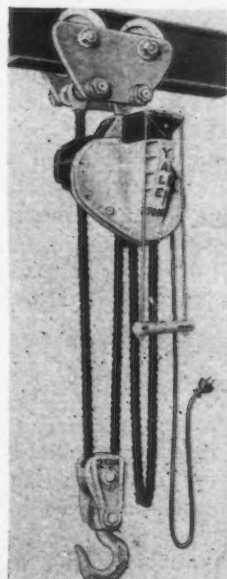
FOR moving boxes, crates, parts and material in stores, factor-



ies, mills and warehouses, the *Massey Machine Co.*, 800 Pearl St., Watertown, N. Y. has placed on the market a hand truck of all steel welded construction, equipped with two rubber tired wheels, said to permit sharp turns and give quiet operation. Three sizes are available with platforms 18 in. wide x 12 in. long, 24 x 16 in. or 30 x 20 in., and carrying capacities of 300, 400, and 500 lb.

Two-Ton Electric Hoist

A TWO-TON model has been added to the line of Midget King electric hoists manufactured



by the *Yale & Towne Mfg. Co.*, 4530 Tacony St., Philadelphia 24, fitting into many industrial applications it is said, where heretofore, heavy-duty electric hoists have been employed. The lightweight, compact unit is equipped with a 1 hp motor. Lifting and lowering action

is obtained by a flip of the wrist on the one-hand bar-grip control, leaving the operator's other hand

free to guide the load. Upper and lower limit safety stops prevent overtravel of the hook, with load brake and independently acting motor brake operating whether the power is on or off. This two-ton hoist is available with hook for stationary use and with a permanently attached trolley for use on an overhead track.

Unscrambling Table

TO systematically and automatically unscramble or regiment a carton, box or crate of bottles, jars, cans or other similar containers which has been unloaded on the table, in a manner that permits them to be conveyed one after another to the conveyor without the aid of a human hand or any personal attention, the *Island Equipment Corp.*, 101 Park Ave., New York 17, has placed on the market a straightline unscrambling table. It is claimed, with this unit one operator can unload from 60 to 240 or more of any size bottles, jars, cans or containers per minute from carton onto conveyor and discharge them to filler in single line.

Shop Lifter

IN the portable elevator field is a shop lifter introduced by the *Service Caster & Truck Div. of Domestic Industries, Inc.*, Somerville, Mass. This compact unit can be used as a die table, lifter and transporter of heavy fixtures, and for tiering boxes, as well as for raising tote boxes, draining drums, positioning heavy work, installation of machine parts, and for loading and unloading motor trucks. The lifting platform is cranked up and down, and a specially designed automatic clutch locks the load in any position. A hand crank, which raises the platform 3 in. with each revolution, is removable. The lifter is equipped with 4-in. Forge-Weld roller bearing casters for easy mobility. A foot-operated floor lock is standard equipment. Overall height of the truck is 6 ft; lift of platform, 4 ft 8 in. from floor; lowered height of platform, 5½ in., and platform size 24 x 24 in. Capacity is 500 lb.

Automatic Material Racks

COMBINING automatic material handling with storage and transportation a three-way unit is being manufactured by the *American Machine & Foundry Co.*, 511

Fifth Ave., New York 17. This new self-leveling material handling system is used for machine operations, progressive assembly, storage and transporting of materials. Automatic material racks speed production as they do away with manual lifting of loaded tote boxes or in lifting materials to working levels. The automatic, spring-powered racks hold a visible bank of material and bring each piece to the operator's hand-level as soon as the preceding piece has been removed. The same working level is constantly maintained and flow of parts or material is continuously timed to the worker's individual capacity. Reloading is accomplished by simply placing material on the platform where it automatically finds its proper level. Activated by self-contained springs, the rack requires no outside power source and is smooth in action, noiseless and trouble-free.

Crane Controller

FOR operating ac cranes from the floor level, a complete line of controllers has been announced by the *Electric Controller & Mfg. Co.*, 2700 E. 79th St., Cleveland 4. The controllers, for mounting on the trolley or along the crane girders are of the magnetic contactor type with accelerating and speed-limiting functions controlled by frequency relays. These relays operate directly from the secondary circuit of the wound-rotor motor and their operation is matched to the induced rotor-frequency, which is directly proportional to motor speed. Controller panels are mounted on vertical angles to facilitate surface mounting against the crane girders. Pivoted at the bottom, panels can be tilted for access to rear-of-panel wiring. Hinge brackets on the side limit the angle of tilt. General purpose or gasketed enclosures are available for all panels.

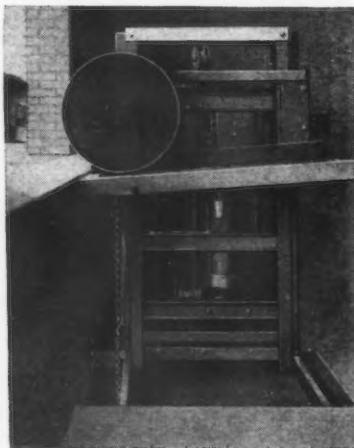
Crane Cab Cooler

AN air-cooled conditioning unit for crane cabs working over ingot molds, soaking pits, or vats where acid or other fumes are present has been announced by the Machinery Div., *Dravo Corp.*, 300 Penn Ave., Pittsburgh 22. The unit which is fitted to the top of the cab is entirely self-contained, and requires only an electric power connection for its operation. All equip-

ment is enclosed in a steel frame and housing. The air supplied to the cab is cooled, cleaned, and constantly circulated; dust and smoke are dissipated; and acid fumes are eliminated by a special fume absorber.

Barrel Loader

ILLUSTRATED is a combination elevating and unloading machine known as an automatic high speed barrel loader which has been built by the *Revolvator Co.*, North Bergen, N. J. It is an adaptation of a short lift standard portable nonrevolvable elevator, incorporating the Z bar and other features of the company's standard *Revolvator* line. Included in the design are safety features said to make accidents al-



most impossible. In operation, the machine is countersunk in position so that the top of the platform when lowered is flush with the floor. Barrels are rolled on to this platform by hand, after which the operator throws a switch to raise the platform. When the platform reaches the correct height for unloading it is tilted so that the barrel automatically rolls off on to the upper level. The platform then returns to the lowered position. The machine can be made portable by equipping the frame with wheels.

Tension Brake

A LINE of brakes designed to apply accurately controllable continuous tension in industrial machinery has been announced by *Linderman Devices, Inc.*, Newburgh, N. Y. Available either as self-contained units or for building into equipment under design, the brakes are a development of the standard Linderman industrial

safety brakes. Features of the brake which make it suitable for applying continuous retarding force are the absence of self-energizing action, permitting accurate control of tension desired; ability to apply heavy loads under ordinary factory airline pressures; and radial shoe actuation.

Torque Hook

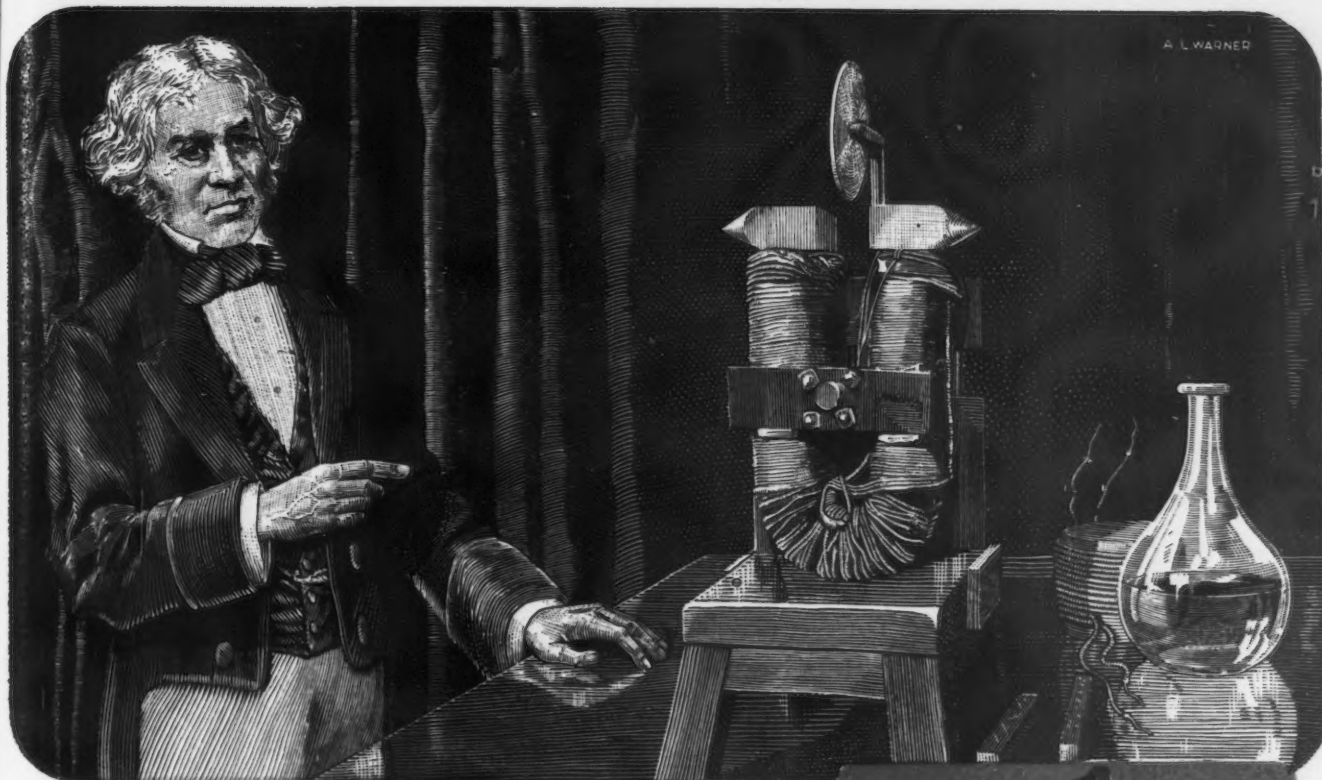
DESIGNED for lifting such structural steel shapes as beams, girders and channels, the Diamond torque hook has been announced by the *Elizabeth Iron Works*, Green Lane, Elizabeth, N. J. This one-operation lifting device applies the simple principle of torque-action to do its work; as the load becomes greater so does the grip of the hook. With the use of the torque hook, it becomes possible to lift and nest-stack steel shapes in one operation, simply by slipping on the hook, thus eliminating the old time and space consuming method of lifting with chain slings and blocking between members of stacking.

Close Clearance Grab

QUICK and safe handling of long, narrow wooden boxes can be accomplished, it is said, with the grab designed by the *American MonoRail Co.*, 13134 Athens Ave., Cleveland 7. Operated from a single hoist hook, the gripper jaws are pulled together, parallel to the load, by the plow-steel cable threaded around the sheaves. Loads up to 1000 lb are held securely, it is claimed, and boxes as long as 20 ft can be quickly moved. The narrow jaws allow close spotting of unwieldy boxes with little lost motion.

Track Shifter

PROVIDING fast and positive track lining with a minimum expenditure of manpower is claimed for the Simplex track shifter, manufactured by *Templeton, Kenly & Co.*, 1020 S. Central Ave., Chicago 44. This device has proved satisfactory for lining any weight track in any type ballast, it is said, and for lining swings, sharp and fast curves, frogs, turnouts, cross-overs and ladder tracks. It permits lining through short road crossings without taking up a single board or digging out the topping. Powered by conventional track jacks, their use in sets of two is recommended.



and then the door is open...

Men of science have a quiet way of doing things. In pursuing the secrets of nature, there comes a moment, every now and then, when a new door is suddenly opened. In 1831, for example, Michael Faraday calmly presented to his audience his newest discovery... a mechanical means of producing electricity. The magnitude of his work remained unrealized until later men, using Faraday's principles, produced the dynamo and the electric motor.

Like science, industry advances quietly but surely. The newer principles of today become the accepted practices of tomorrow. In metalworking, new and better materials and methods are in a state of continuous adoption by industry. A review of only the last ten years makes this evident. In that important phase of metalworking where the forming of metals with presses is involved, Clearing has provided many outstanding machines. In the future, whatever industry's requirements, Clearing will continue to offer its facilities wherever presses can be the answer to a problem in production.

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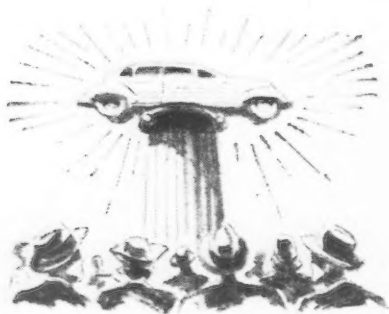
Engineered for the Job

THE IRON AGE, August 8, 1946—77

Assembly Line . . .

WALTER G. PATTON

• **Automotive executives list reasons for not attending Reuther conference . . . Union charges rejection a deliberate policy by industry.**



DETROIT—If you were an executive in the automobile industry and read in the Sunday paper that you were being invited by the president of the UAW (CIO) to a conference to discuss methods of increasing production in the automobile industry—and you didn't receive your personal invitation until the following day—you might be hesitant about accepting the invitation.

If you felt that a "town meeting" conference by two parties, where neither of the parties, the UAW (CIO) union officers or management, have authority to control the problem, you might also be inclined to snub the invitation.

If you believed that no two automobile companies are affected alike when shortages of parts and materials occur, you might suggest that the problems could best be dealt with privately.

Finally, if you had a suspicion that such an invitation was only a disguised opening wedge for industrywide bargaining—to which you were unalterably opposed—you might find additional grounds for failing to attend the proposed conference.

While these are not all the reasons given by the automobile producers for declining to accept the UAW (CIO) invitation, they do explain why only Kaiser-Frazer Corp.

and Willys-Overland Motors, Inc., accepted Reuther's invitation while Ford, GM, Chrysler, Nash and Packard declined to send a representative to the recent meeting at the Book-Cadillac in Detroit. Studebaker accepted but expressed doubt as to the value of a general meeting.

All motor car producers are in agreement that the answer to the low level of automotive production currently lies in the plants of the parts makers and other industries supplying them materials. Several called attention to the fact that earlier stoppages in coal and steel are still being felt and will continue to be felt for many months to come. This was a point which Reuther had failed to mention in attempting to absolve the union of responsibility for the present situation.

Ford took sharp exception to Reuther's assertion that only a few strikes are current in auto plants, charging that the invitation, however well intended, was misleading and left the impression that Reuther was not acquainted with the simple facts of the case.

In a subsequent press release Ford brought out that 25 of its suppliers are currently closed by strikes, that 15 are affiliated with the UAW (CIO) and six of seven critical suppliers are UAW affiliates.

Mentioned specifically by Ford were strikes at Federal Bearings Co., Poughkeepsie, N. Y., Waterbury Steel Ball Co., Firestone Rubber & Metals Products Div., Wyandotte, Mich., and Dura Div. of Detroit Harvester, Toledo. If continued for another 5 or 6 days, Ford said, these strikes would stop passenger car or truck production or both.

Other critical Ford suppliers on strike include National Screw & Mfg. Co., and Lamson & Sessions of Cleveland, both of which supply bolts, nuts and screws. The strike at Long Mfg. Div. of Borg-Warner Corp., Detroit, is also critical, it was said.

THE reply to Reuther's invitation sent by Herman L. Weckler, vice-president and general manager of Chrysler Corp. was equally firm,

pointing out that Chrysler deals with 3300 supplier firms and that the problem is to reestablish a smooth and continuous flow of adequate quantities of many and varied materials, components and supplies essential to full volume production and to attain in factories those standards of production, quality and discipline which characterize an efficient operation.

Weckler called attention to the fact that 142 strikes have occurred in plants of Chrysler suppliers, 17 of which are still going on. Since VJ-Day, he said, Chrysler has had 39 strikes in its own plants involving 79,641 employees, none of which was an "authorized" strike. All, he asserted, were in violation of the union's contract with Chrysler and could have been avoided "if the men involved had resorted to the bargaining procedure under the contract with the union."

According to Weckler, Chrysler originally scheduled 846,495 vehicles for the 9 months ending in June, 1946; actual production totaled 317,560—a loss of 528,935 vehicles. By the end of the third quarter, he said, Chrysler will be 688,185 vehicles behind schedule.

While declining Reuther's invitation, Chrysler expressed a willingness to discuss the situation privately with Reuther. Studebaker, Nash and Packard extended similar invitations.

The reply to Reuther's invitation sent by C. E. Wilson, president of GM said that the corporation has sustained a loss of 1,000,000 passenger cars and \$200,000,000 in wages as a result of the GM and suppliers' strikes.

There have been, he told Reuther, 617 strikes in the U. S. that have affected GM suppliers and GM production. The results of the strikes in the steel, coal, glass, copper, electrical and railroad industries are still being seriously felt, according to Wilson.

Attention was called to the fact that during recent weeks GM has been bringing to the union's attention the number of strikes affecting the GM production. Of the strikes going on, he added, 20 were by

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GREENFIELD

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UAW (CIO) unions and 21 are by other CIO unions.

Some observers here feel that the publicity being given to strikes by GM has been a major factor in prompting Reuther to call the conference.

Wilson expressed the hope that a review of the strike situation and the effect on production, prices and employment "will result in more responsible union leadership and avoid subjecting our nation to another wave of strikes similar to those we are just getting over."

ACCORDING to G. T. Christopher, president of Packard, original plans called for the production of 179,800 cars from the start of production in October, 1945, through December, 1946. On eleven different occasions, he said, these schedules were reduced, bringing the present schedules, which he described as "optimistic," to 71,388.

Christopher listed the materials currently limiting Packard production as steel, pig iron, terneplate, copper, cotton goods, lead, scrap iron and leather. He also listed 12 supplier strikes which are currently throttling Packard output.

Studebaker's experience is similar, with actual production falling short of peacetime goals by 68 pct. Production originally scheduled from Oct. 1, 1945 to July 1, 1946 was 134,500 units; actual production for the period was 43,011.

"Our failure to attain scheduled production was due almost entirely to strikes and slow-downs in the plants of suppliers," president Hoffman said. A total of 4000 employees have been laid off as a result and 5000 more will soon be jobless if the strike in a supplier's plant continues.

IN its rebuttal, the union charged that the almost unanimous rejection of the UAW proposal was a result of a "deliberate policy" by industry.

The statement said that low production had been chosen as a fixed policy by important sections of American industry. According to the union, cushion springs are short because of outright refusal of steel producers to make and sell spring wire at ceiling prices. The copper shortage was attributed to a lock-out by copper mine operators. Castings were short, according to the union, because scrap is being

hoarded. No explanation was offered for current shortages of sheet steel.

After reviewing all the evidence being bandied about so freely this week the prospective buyer of an automobile could be reasonably sure of several things: He will probably have to wait longer than he ex-

U.S. Steel Earnings Report Shows High Cost of Coal Strike

New York

• • • U. S. Steel Corp. reported net income for the second quarter of 1946 totaling \$13,900,270 and for the six months period ended June 30, 1946, \$24,138,541. Irving S. Olds, chairman, said that income for the quarter would have amounted to only \$2,133,479 had there not been created during the war years a fund to cover abnormal costs arising out of the war, against which the strike charges were made. The cost of the 2-months' coal strike, starting Apr. 1, 1946, was \$18,148,917, without any consideration of loss of income because of reduced sales of steel. Of this amount \$3,077,331 were in coal operations and \$15,071,586 were in steel operations. The earnings of \$24,138,541 for the first half of 1946 compares with \$32,153,373 for the first half of 1945.

Steel shipments during the second quarter of 1946 amounted to 3,168,589 net tons, compared with 5,123,714 net tons of finished steel shipped in the second quarter of 1945.

Mr. Olds indicated that the combined shortages of scrap, coal and freight cars were the most serious factors faced by the company at present. To date, production has been lost in Chicago because of the car and scrap shortage, and the situation may get worse, especially with regard to freight cars.

The newly acquired Geneva Steel Co., is now operating three of its nine open hearths, and will be producing plate and perhaps some structural in August. New construction at Geneva is still in the ordering stage, with no work actually started. The steelmaking capacity of Geneva, pegged during the war at 1,283,400 net tons per

year, will be drastically reduced because it will be based on finishing capacity. Currently, plate capacity at Geneva is 700,000 tons a year and structural capacity is 250,000 tons a year. Prewar plate consumption on the West Coast, totaling only about 200,000 tons a year, is not sufficient to justify full operation of the plant. Further, Bethlehem and Kaiser have plate capacity in that area, so the market is highly competitive. It is highly problematical that on plates alone Geneva could compete on the coast with these producers, absorbing the freight from Geneva to the Coast.

Mr. Olds indicated that the manpower situation in the various operations of U. S. Steel was not a limiting factor on production, but there were certain spots that it was tight, for example, Geneva. Mills are working more on a straight time basis, with no premium pay, which accounts for a substantial part of the drop in average payroll. As a matter of fact, June, 1945, premium pay was about five times greater than premium pay in June, 1946.

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Private Firm to Handle Government Disposal

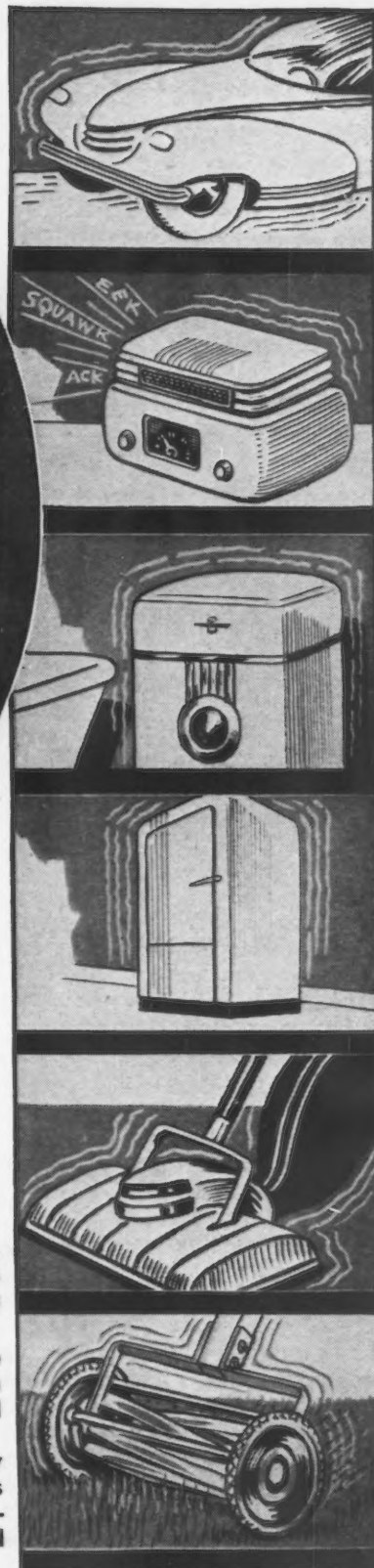
Washington

• • • Arrangements are being made by which a private commercial firm, Walsh Construction Co., New York, will inventory and sell approximately \$286 million worth of war surpluses for the WAA on a cost-plus fixed-fee basis.

A letter of intent has been signed with the company preliminary to contracting formally with the firm for surplus disposal.

Heavy construction equipment and ship equipment including turbines and generators, comprise the bulk of the surplus at the four sites. However, materials of a general nature, both new and used, are included also, WAA said.

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Washington . . . ■ ■ ■ L. W. MOFFETT

• Industry must initiate own case for increased prices under revised OPA . . . Agency will be more flexible . . . Commerce ballyhoos FTC basing point policy.



WASHINGTON—While there are indications that the re-created OPA will move faster because of the ever-threatening possibility of action by the Price Decontrol Board, the price agency is still going to take full advantage of the 60-day waiting period—before new ceilings based on 1940 prices are calculated.

The new law specifies that OPA must adjust ceiling prices on manufactured items to reflect average 1940 prices on a product basis, plus accrued costs since that time. But the agency is not required to take such action unless petitioned to do so by individual industries and it is given 60 days in which to make its findings.

The extension bill specifically places the burden of proof on industry. Data, assembled under usual accounting procedures, must be presented to OPA to back up industry claims. One OPA official said that this section is "the biggest boon in history for certified public accountants."

In any case, OPA has finally been waked up to the fact that price control must be flexible even though the awakening had to be written into law. The agency also realizes that prices are going up all along the line. In effect, OPA is now presiding over "legalized inflation,"

whereas a free market would mean a leveling off of prices at natural levels, reflected by the law of supply and demand—now slightly discredited in Washington.

On the other hand, OPA might also be administering its own death potion in slow doses, under the direction of the all-powerful Price Decontrol Board.

This new board, set up in the law to supervise the lifting of price controls, is still an unknown factor, but it has the power to become the most important feature of the extension act. The board members are Chairman Roy L. Thompson, president of the Federal Land Bank of New Orleans; Daniel W. Bell, former Under Secretary of the Treasury and Washington banker; and George H. Mead, chairman of the board of the Mead Corp., Dayton, Ohio. These men are not extremists and their appointments were well received.

The board's chief function is to hear and decide petitions for decontrol from industry advisory committees which have been denied in whole or in part by OPA. Decisions of the board are final and are not subject to review by any court.

In general, the board will abide by the decontrol standards outlined in the extension law, namely: (1) Controls must be lifted on all commodities not important in relation to business costs or living costs before Dec. 31, 1946, and (2) controls must be lifted on any commodity when supply exceeds or is in approximate balance with the demand (including appropriate inventory requirements.)

IF PRICES rise on any decontrolled item, after a reasonable test period, controls may be reestablished by OPA, provided the board gives its advance consent in writing.

The Barkley amendment, which established 1940 as the base year for calculating new ceilings, will provide OPA with many anxious days in the months ahead. The Taft amendment, contained in the original vetoed bill, would have fixed 1941 as the base year. OPA's old base period was 1936-39.

The price agency says increases will not be as great under the 1940 provision as they would have been

if the Taft amendment became law. Immediately after the extension bill was signed OPA estimated the initial increase in steel prices at about \$1.50 a ton, but this was later revised upward. However, OPA says under the Taft amendment steel prices would have jumped from \$4 to \$8 a ton.

THE following reasons are given by OPA to back up their position that price increases will be held to a minimum:

(1) The new law makes reasonably adequate provision for the adjustment of temporary, abnormally high costs.

(2) Consideration is also given to the practicability of increased production in determining the magnitude, and incidence of compelled price increases.

(3) The vastly more limited number and magnitude of price increases required reduce substantially the likelihood of widespread withholding by industry while waiting for price increases.

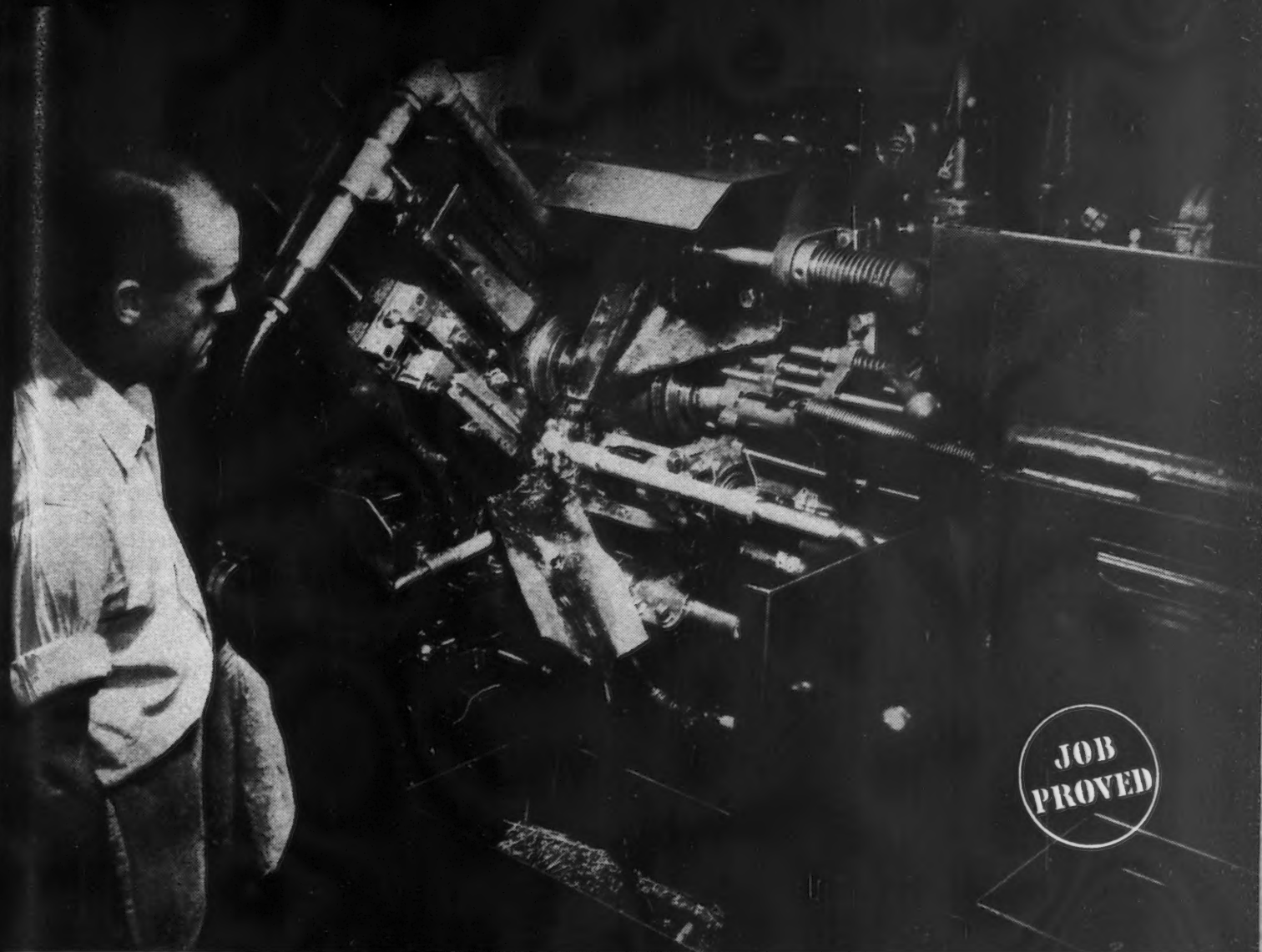
(4) The specific clause in the vetoed bill which would have destroyed wage stabilization has been eliminated.

(5) The required adjustments are to be made on an industry-wide basis, permitting the maintenance of uniform ceiling prices and making possible effective enforcement of the compliance with prices after adjustment.

(6) New ceilings cannot be held invalid on account of their failure to return costs to any particular member of any industry involved in a price action.

In setting forth this analysis the agency is on solid ground, for it is merely re-echoing specific clauses of the extension act. It is quite clear that OPA still has wide discretionary powers, and if the Price Decontrol Board were not always just around the corner industry might expect an intensified renewal of OPA's delaying tactics. It must be remembered that OPA is now staffed with relatively few businessmen, but there are still some able persons who, under difficult conditions, manage to retain their poise. Individuals who came in as clerks just a few years ago have risen to top jobs.

Already there is talk about needed control on specified commodities



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Type of Machine: New Britain Gridley automatic screw machine, 2" capacity, No. 61, six spindles.

Metal: S.A.E. 4140 bar stock.
Operation: Forming, drilling, tapping, and threading.
Speed: 85 SFPM

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after June 30, 1947—when price control finally expires. The bill provides for the transfer of control on commodities, deemed to be in short supply by the President, to agencies other than OPA. Any such shift of power to other agencies would undoubtedly be accompanied by a transfer of OPA personnel. This is an old Washington custom. It emphasizes the old gag that a government bureau is immortal.

The government's subsidy powers have also been drastically curtailed. The inauguration of new subsidy programs or any increase in subsidies in effect on June 29, 1946, is prohibited. Premium price payments for copper, lead and zinc—to the tune of \$100,000,000—have been continued as has RFC's purchases of tin ores and concentrates necessary to assure continued operation of the Texas City tin smelter.

In cases where subsidies are discontinued or reduced, OPA must grant corresponding price increases.

* * *

IN THE July issue of the Dept. of Commerce's "Domestic Commerce," newly and attractively printed in a small sized format, the lead article is entitled "Basing

Point Systems Curb Competition in Business." The article carries the byline of Ewin L. Davis, recently reappointed for another 7-yr term as a member of the Federal Trade Commission. The article is well written from the viewpoint of the Commission, a traditional and unrelenting foe of the basing system, whether it operates on a single base or on multiple bases. Reports are that because of its exparte character a reply will be made in Domestic Commerce to Mr. Davis' presentation.

The interesting thing about this article, however, is that it is published by a government agency other than that represented by the author. Use of Secretary of Commerce Wallace's publication for propagandizing the FTC's policy arouses the suspicion that it is a joint Dept. of Commerce — FTC buildup for an on-coming hearing before a subcommittee of the House Small Business Committee.

Headed by Representative Estes Kefauver, D., Tennessee, the subcommittee is going to launch an investigation having to do with the old and often probed subject of monopolistic practices as they affect small business. Taking part in the

hearings will be FTC, Dept. of Commerce, Dept. of Justice, RFC and WAA. Figuring conspicuously in the proceedings will be the inevitable FTC presentation on the basing point system, with Dept. of Commerce backing. Commerce may be expected also to do its own backslapping on what it is doing for the small businessman.

UNWILLING to be outdone, the other agencies no doubt will attempt to show what they are also doing for small business, which, according to reports, has become skeptical of the great solicitude shown for it by various government representatives, including members of Congress.

The hearing may develop another interesting phase as it bears on the basing point system. It is not proclaimed from the house tops but it is well known that there is considerable under-the-surface rivalry and jealousy between the FTC and the Dept. of Justice as to which shall initiate action against the system. At present both have proceedings against the system. The Dept. of Justice proceeds under the Sherman Anti-trust laws. FTC proceeds under the Clayton and the Robinson-Patman Acts. It may be that some determination may be made so that only one of the agencies will handle the subject. If that is so, the bets are on FTC. The FTC is a creature of and reports direct to Congress. The Dept. of Justice reports direct to the President. That makes a difference.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



Permits Some Direct Sales

Washington

• • • Acting upon a recommendation of the Civil Aeronautics Administration and the War and Navy Depts., WAA, in an effort to speed disposals, has authorized owning agencies to make direct sales of special aeronautical tooling to war contractors. It was pointed out that the contractors are the only persons who can utilize this special tooling, which otherwise would have value only as scrap.

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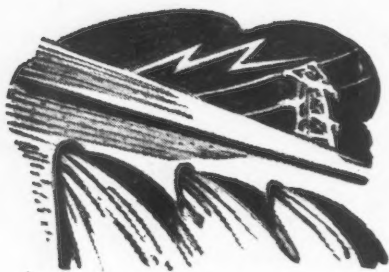
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West Coast . . .

ROBERT T. REINHARDT

• San Francisco hearing on proposed reduction in freight rates from Geneva, Utah, elicits no protests, but develops requests for parity . . . Darrin car to be produced at Grand Rapids, Mich.



SAN FRANCISCO—Geneva is the pin-up girl of western steel consumers, judging from the testimony given at the public hearing before J. P. Haynes, agent for the Pacific Freight Tariff Bureau, and assembled railroad traffic men, held July 31 to determine what, if any, opposition existed to the establishment of an \$8.00 per ton rate on finished steel from the Geneva Steel Co. plant in Utah to Pacific Coast points.

As had been expected by traffic men, the closest approach to opposition to the setting of the low rate was voiced by Kaiser Co., Inc., and Bethlehem Pacific Coast Steel Corp. which, in effect, was only a plea that they too expected the same considerate treatment which might be afforded the U. S. Steel Corp. subsidiary.

All in all, the hearing was a rather dull affair although attended by approximately 80 steel consumers and their traffic men, representatives of several steel producers, traffic men from chambers of commerce of western cities and Governor H. B. Maw of Utah. The traffic experts for the several railroads concerned were patient listeners, but entirely uncommunicative in respect to their opinions. This is understandable since no de-

cision on the granting of the rate could be made until some time after the hearing on the subject before the Transcontinental Freight Bureau in Chicago last Friday.

The case for the Geneva Steel Co. was briefly put by H. M. Dachbach, traffic manager, and consisted of a request for establishment of a rate of 40¢ per 100 lb on iron and steel articles as described in PFTB tariffs 260-A, item 370-A, ICC 1425 from Geneva, Utah, to South Pacific Coast points and in PFTB tariff 52-F, ICC 1360 from Geneva, Utah, to north Pacific Coast points. These tariffs include practically all finished steel products.

Consensus of many traffic men in this area is that the railroads concerned may be willing to ride along on the \$8.00 per ton rate to California points, but will balk at the same rate applying to Portland and Seattle. This assumption is based on the fact that even the unpublished rate used on government shipments from Geneva during the war under Section 22 called for \$9.50 to Portland, \$10.00 to Seattle and Tacoma and \$10.50 to Bellingham and Everett, Wash.

What lies ahead for all railroads if the lower rate is set for Geneva is indicated by a portion of the testimony given by A. P. Heiner, freight traffic manager for Kaiser Co., Inc. He said, in part:

"We again endorse the program of creating a freight rate structure on steel and related products which will improve the ability of the steel manufacturers to distribute steel in the West. This entails the obligation upon the carriers to maintain equality between manufacturers of steel as well as between consumers of steel. It further requires a proper balance between rates on essential raw materials and rates on finished products. . . ."

"We have further written to Mr. William Dana, chairman of the Transcontinental Freight Bureau, requesting rates from Fontana to transcontinental markets on the same basis as any that may be established into California from eastern mills. . . ."

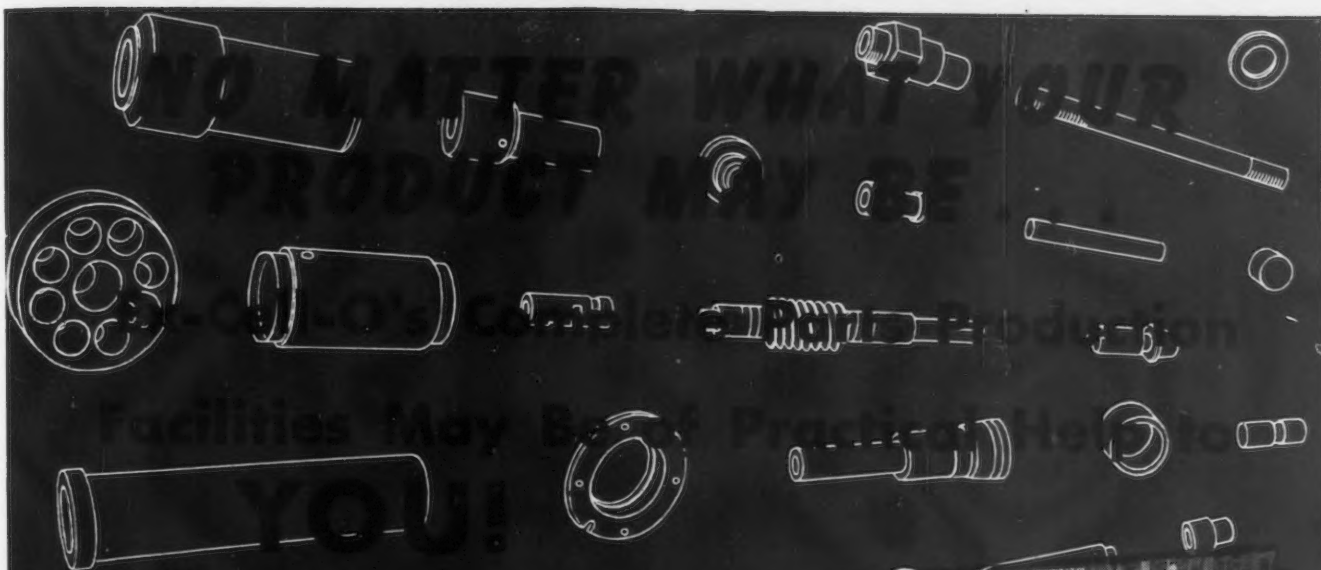
"WE therefore request the carriers to establish a rate of \$3.28 per net ton on coal from Utah to Fontana. This is 41 pct of the requested \$8.00 rate on steel. It is predicated on the pattern of steel and coal rates in other steel producing areas. Specifically, it is on the same basis as steel and coal rates between Pittsburgh, Pa., and New York City."

The present rate on shipping coal from Utah to the Kaiser blast furnace at Fontana, Calif., is \$4.43.

The position of the Bethlehem Pacific Coast Steel Corp. was stated by Frank Hubert, Jr., newly appointed assistant traffic manager. He pointed out that he was speaking only for the local company and that the Bethlehem Steel Co. would present a case at the Chicago meeting in connection with transcontinental and eastern hauls.

Briefly, it was the contention of Bethlehem that if the lower rate was granted, similar reductions in rates should be allowed this company on hauls between its plants in Los Angeles, San Francisco and Seattle, and to Portland, Ore., and Boise and Pocatello, Idaho.

Among those who spoke in support of establishment of the lower rate were: Kenneth T. Norris, president, Norris Stamping & Mfg. Co. of Los Angeles; Frank S. Clay, secretary-manager, Portland, Ore., Traffic Assn.; O. T. Helping, traffic manager, Port of San Diego; H. W. Smith, vice-president, Isaacson Iron Works, Seattle; Alden G. Roach, president, Consolidated Steel Co. of Los Angeles; Gus P. Backman, secretary, Salt Lake City, Chamber of Commerce; Amos K. Bagley, executive secretary, Utah Manufacturers Assn.; H. W. Prickett, transportation consultant, State of Utah; E. O. Foubert, traffic manager, Pacific States Cast Iron Pipe Co.; Paul F. Gillespie, president, Judson Pacific-Murphy Corp., San Francisco; Clayton Jenkins, manager, Provo, Utah, Chamber of Commerce; James F. Bone, manager, industrial dept., Los Angeles Chamber of Commerce; Walter A. Rohde, manager, transportation dept., San Francisco Chamber of Commerce; A. G. Streblow,



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GOVERNOR MAW, of Utah, considered the matter of such importance that he drove all night to appear before the rail representatives. Stressing the importance of the continued operation of the Geneva plant to the economic stability of his state, Governor Maw said:

"... it is perfectly apparent that unless freight rates are materially reduced on finished steel products, there can be no industrial expansion of the West. In fact, the economic future of Utah is so closely tied up with lower freight rates on finished products from Geneva to points on the Pacific Coast, that its future industrial expansion is dependent upon the action of this board. At the present time a number of manufacturing institutions are awaiting the determination of this issue before accepting invitations extended by agencies of the state to establish branch manufacturing plants in Utah and the West. Reasonable freight rates on unprocessed materials have long been enjoyed by companies who have followed the practice of shipping our natural resources to other areas to be processed. If Utah and the West are to enjoy their full share of industrialization and if fabricating plants are to be set up west of the Rockies and a decentralization of industry which will be so desirable during an

atomic age is to materialize, then freight rates on finished products manufactured in the West must be reduced to whatever degree is necessary to put them on a competitive basis. The issue, therefore, is much bigger than might at first be thought, for the industrial future of my state and other western states is largely dependent on its determination."

* * *

LOS ANGELES—Advanced automotive engineering developments are featured in a new medium-priced, custom-type car built here by Howard A. Darrin. Shown at a special press preview in Hollywood, the "Darrin," a five-passenger convertible, is expected to sell for about \$2000. Full scale production will begin in 1947. (First reported in *THE IRON AGE*, May 9, 1946.)

"Manufacture of the car according to present plans," Mr. Darrin told *THE IRON AGE*, "will be by Hayes Mfg. Co. at its Harrison St. plant, Grand Rapids, Mich. Los Angeles is also being considered as an assembly point. Hayes has been working on production and engineering plans for over a year and a half. We expect to turn out 500 during the remainder of this year and begin full scale production of 30,000 cars per year in 1947."

Design of the car is after the custom-built fashion for which Mr. Darrin is noted. The car is low-slung, has clean streamlining and

a minimum of chrome ornament. A 100-hp Continental motor will be used. Specifications list a 115-in. wheelbase; 20 ft turning radius; and overall dimensions of 185 in. long, 68 in. wide, and 56 in. high.

Mr. Darrin, who styled the Kaiser-Frazer bodies, claims several interesting manufacturing economies. Body stampings have been reduced to four: Front fenders and motor hood are one piece; doors are separately stamped; and rear portion, including fenders, is a single stamping. A simple square chassis frame will greatly facilitate mass assembly and jigging. Side pieces of the frame are 6 in. by 2 in. box type sections; cross pieces are tubular type. A front subassembly will act as a mount for the power package, which consists of engine, brakes, transmission, wheels and radiator. The front section will be completely assembled prior to final assembly on the main square frame.

Several safety features of the "Darrin" are noteworthy. The chassis, which extends to the sides of the car, forms side bumpers and also acts as curb scuffers. Motion pictures of chassis tests revealed great torsional rigidity of the square frame. Chassis construction, low center of gravity, and only 2400 lb weight give the car excellent road holding and performance qualities, it is claimed.

A one-piece curved windshield and low motor hood are said to give the driver improved road and curb visibility.

Independent torsion bar suspension is used for the front wheels. A semi-elliptic hypoid gear is used in the rear axle. Shock absorbers are airplane type, diagonally mounted.

Novel arrangements of the car include use of the hollow front subassembly as an air scoop and ventilation duct; a hidden gas intake tube is located behind a hinged rear license plate which is sunk flush with the body line; and hydraulically operated doors, windows, front motor hood, rear window of convertible top and front seat.

An important production factor, Mr. Darrin pointed out, is that all mechanical parts are of standard make, although the engineering features and the body design are distinct departures from conventional models.

WHAT, NO CHROMIUM? A stainless steel grille replaces the glaring, gleaming conventional chromium in the new Darrin. Other novel features in the car include independent torsion bar front wheel suspension and a one-piece curved windshield.



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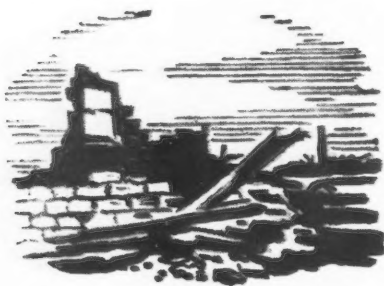


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European Letter . . . JACK R. HIGHT

• **Steel Board selection delayed . . . British occupation authorities may revive industrial activity of the Ruhr . . . Scrap cartel due to appear if and when Europeans can import from U. S.**



LONDON — The selection of a suitable board for the control of the iron and steel industry while the nationalization process is under way is proving to be a slower job than most authorities here anticipated. When the original announcement was made in the House of Commons the opinion was that the makeup of the Board would be announced in a short time. To date there has been no indication on the subject, and there are current rumblings which indicate that the Minister is not getting the type of cooperation which he would like from the steel industry.

While other industry officials have stepped in to offer as much cooperation as possible to the government after the decision for public ownership was made, the position for the members of the British Iron & Steel Federation is a little difficult. There is some administrative confusion as to the exact function of this interim board that is to be established. The original statement by the Minister of Supply indicated that among other jobs it would have to determine what would be nationalized and what would not.

Since that time there has been considerable elaboration from the government as to what sections of the industry will get the ax, so there is much less of this type of definition remaining. The Minister has also proclaimed that he did not mean any such thing. But it

does seem likely that at least the board will have to apply certain criteria laid down by the government in such determinations and exercise some measure of judgment in deciding who is to sink with the ship and who is to get in the lifeboat.

Rightly or wrongly, some members of the steel industry feel that to be members of such a board would place them in an unwholesome position with respect to their stockholders, and do not want any part of it. There is a probability that the issue will be resolved soon.

The first fireworks in Paris among the big four foreign Ministers on the German question threw into sharp relief the current problem facing the American and the British zones. The arithmetic of the occupation is simple. It is costing the U. S. \$200,000,000 to run its zone this year and according to British figures its occupation bill will be \$320,000,000 for this year. While the Potsdam agreement was in process America and Britain "assumed" the treatment of Germany as an economic whole. That is, an excess of foodstuffs in the Russian zone or manufactured goods in the British zone would be used to make up for shortages in other zones.

WHAT Messrs. Byrnes and Bevin are complaining of is that Russia has made it a policy to operate her zone on a self-sufficiency basis, and thus indirectly we have been subsidizing the Russian occupation and thus Russia itself. The evident temper here in Britain today is that it cannot go on. While America is trying to follow somewhat the same policy by refusing further reparation shipments to Russia, there is little in the way of economic weapons in the American zone that we can use as a threat. The British occupying force is in a more fortunate position. The British Army of Occupation is holding two of the last three trumps in the German deck. Food is the one that is missing; it is in the Russian zone. The two cards which Britain is holding close to its chest at the moment are coal and steel. The British Foreign Minister made it quite clear in Paris that if we are not going to treat Ger-

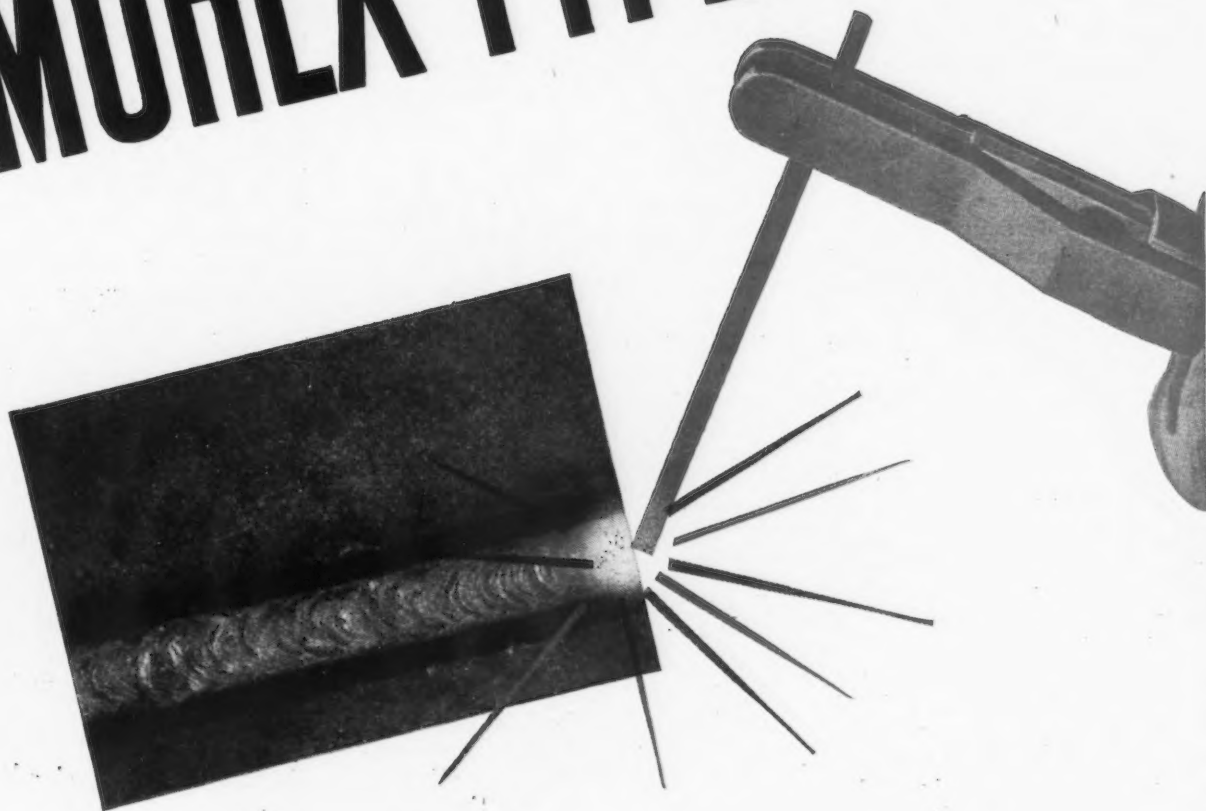
many as a whole, then Britain would attempt to make its own zone pay for itself. With the Americans in about the same frame of mind, what might eventually happen is that a system of close cooperation between the American and British zones would develop, and every effort would be made to render them self-supporting.

The first and most obvious step in this direction would be to stop all exports of coal that could be used by the Ruhr steel industry, and get German industrial production back on its feet within the limitations of the bomb damage. This action would have an almost immediate effect on the Western Germany economy, as well as on the economies of all the other European countries now receiving coal exports from the Ruhr. Because of the drastic effect that such a diversion would have on France, Belgium, Holland, and the rest of Western Europe, it will almost certainly never be taken on the bold lines that I have described. On the other hand, because there is no real hope of the British or anyone else being able to get Germany on its feet until there is some increase in industrial activity, it is likely that there will be a trend in this direction.

IN THE months past there has been an increasing tendency on the part of the British occupying authorities to attempt in the face of considerable external pressure to retain additional coal for Ruhr industries. This trend has already been recognized by the European Coal Organization, which has already predicted that the next 12 months will see a decrease in German coal exports.

How great a cooperation is possible between the U. S. and Britain in occupying the two zones is problematical. Britain needs food, and the means to pay for food imports. While the American ideology is about the same in relation to the Russian occupation, there is not much help that the American zone can give to the British. The American zone can have no substantial food surplus, nor can it offer manufactured goods. The American zone does need coal and steel from the Ruhr, but so does everyone else in the neighborhood.

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The almost unfathomable gap that has grown up in less than a year of occupation between the various zones can certainly not be blamed on the Russians. While there can be no denying that the methods have been different, there are very great gaps between the three western zones as well. It would be incautious to assume that because of this new outburst amongst the foreign ministers it will be automatically any easier for Germans in the British zone to carry on normal commercial transactions with another German firm in the American zone.

The establishment of the four zones made Germany into four countries, and we are only going to be able to weld those countries together while the occupation goes on by means of a lot of hard work. Some of the work is already going on, but there is a lot of it as yet untouched.

* * *

THE long range question in the scrap field in Britain is, where is it going to come from? As far as Britain is concerned, in any pre-war year, whenever steel production went over 10 million metric tons, the British mills automatically became scrap importers. Today there are good supplies of battle-field and war damage scrap coming, and despite a high ingot rate there is plenty of scrap. But in 1948, or later, when the modernization program in the steel industry is effective, and ingot production goes up to around 16 million metric tons, the war scrap will be disappearing.

In the prewar period the difference would be made up by imports, mostly from the east coast of the U. S. Merchants here are aware of the increasing world trend toward planning in all branches of industry, and know that there are sections of opinion in America which favor retaining American scrap, or at least working out a system of licensing exports.

While watching carefully any manifestations of this feeling, producers here feel that the scrap will be available, and possibly more easily as the emphasis of steel production in America moves away from the east.

At present there has been no official action to reestablish the International Scrap Convention, but some of the same factors which motivated its operation before the war are in sight today, and some

form of agreement is likely. The trade here feels that there must be some agreement to protect consumers on this side from avaricious American scrap salesmen who take advantage of the shortage over here.

ON the other hand the government is controlling scrap exports from Britain, simply saying "thou shalt not." In the face of such an interdict, there is no need for any type of a domestic cartel arrangement, as it could never hope to be that strong internally.

British scrap prices, which are still controlled by the government, are at substantially the same level of 1937, although costs have increased considerably. Yard labor which started at about 19¢ an hr before the war now starts at 38¢ an hr. Other costs have gone up proportionately. There have been a number of slight increases in the

price ceilings to cover freight increases, and there is another due on this score, but any kind of general price relief to cover other costs is unlikely.

The trade feels that this is a pure question of political expedient, as it would be easy to indicate on economic grounds that an increase is justified, but due to increases already announced on the controlled price of steel the government cannot afford to permit further increases. Coal costs have increased so greatly, and have gone up even further since a general steel price increase the first of the year that absorption by the steel mills would be impossible.

What is happening is that the merchants are paying less and less for scrap which they acquire, and in cases of the less desirable light grades, of which there is a glut, the producer usually is paying to have them hauled away.

British Get Machinery As Reparations for War

Brussels

• • • Britain is to receive tools for the manufacture of brick-making machinery and for making machinery for the iron and steel industry as her share of an allocation of reparations, according to an announcement by the Inter-Allied Reparations Agency.

The agency stated that apart from reparation of shipping losses, one of Britain's most urgent problems is to provide houses. Britain also urgently needed equipment for manufacturing machinery for the iron and steel industry, which must form the very base of the recovery of the national economy, and "delivery from her own works of some of the machinery needed would require at least two years and their importation would involve a time lag nearly as great."

Machine tools formed the greater part of the allocations because, said the agency, to deprive Germany of her capacity to manufacture machine tools was the most practical first step towards reducing her war potential. Dismantling of the equipment would begin at once, as immediate availability of the tools would enable the allied nations to manufacture products vital to their industries.

The agency also disposed of two

power stations, two small arms factories, and a steel plant. Australia received printing machines and machine tools from three works, and India a complete German machine tool plant from the works of Wagner and Co. at Dortmund.

Auto Sales Controlled

London

• • • The British Motor Trade Assn. has evolved a plan to prevent the resale of new motor cars at inflated prices. After Aug. 15, when the plan will come into operation, priority of deliveries will be accorded only to those who need an automobile for their own personal, business or professional use. To insure this, all purchasers will be required to execute a deed of covenant to retain their motor cars for their own use for a period of six months.

At the same time all distributors and dealers will be prohibited from buying or selling new or nearly new cars of current manufacture at inflated prices.

In the event of a breach of the covenant by a purchaser he would have to pay to the dealer 45 pct of the list price of the car, including purchase tax, as "liquidated damages." Should a dealer break the rules, the manufacturers would be instructed to stop supplies to him.

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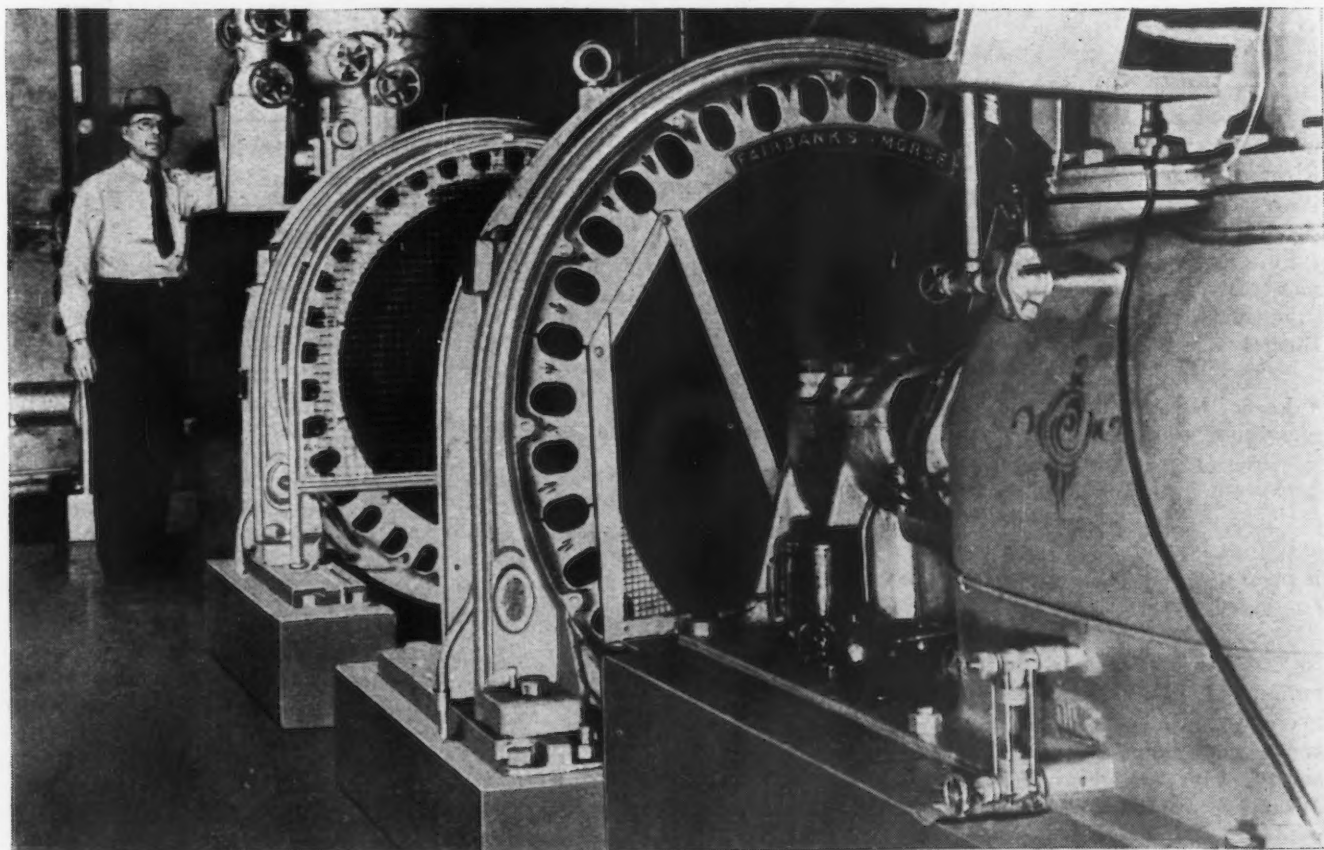
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PERSONALS

• • •

• **Paul G. Strom** has been appointed supervisor of agricultural extension of American Steel & Wire Co., Cleveland, U. S. Steel subsidiary. He was formerly connected with the State Highway Dept. in Minnesota for several years, after which he served with the Soil Conservation Service of the U. S. Dept. of Agriculture. Then for 2 yr he was a field representative for the Union Central Life Insurance Co.

• **Robert L. Springer**, former sales and service engineer for Vanadium-Alloys Steel Co. and for the past 7 yr Chicago sales manager of Rustless Iron & Steel Co. and Geary Stainless Steel Co., has returned to Vanadium-Alloys as engineer and representative in the Chicago district.

• **V. E. Rennix** has been appointed Chicago regional sales manager of the Electro-Motive Div., General Motors Corp., La Grange, Ill. Mr. Rennix joined the division as district sales manager of the Chicago region and held that position until his recent promotion. He came to Electro-Motive in 1944 from the War Production Board where he served as consultant to the director of the Transportation & Equipment Div. Mr. Rennix replaces Clyde A. Sattley who joined the Electro-Motive Div. in 1926.

• **Louis H. Armstrong** has been appointed assistant to the general manager of the Rustless Div. of American Rolling Mill Co. at Baltimore. He has also been elected assistant secretary of the American Rolling Mill Co. He was first employed in Rustless in 1936 in the copper plating research dept. In 1942 he was made personnel manager. **Stanley M. Brah** has been appointed supervisor of personal relations, after having served 4 yr as training advisor. **Joseph F. Mohan, Jr.** has been made training advisor. He joined the organization in 1944 as supervisor of personnel research and has continued in that position until this advancement. **Wilbur W. Cole** has been appointed works accountant. His first connection with the Rustless organization was in 1929, as a cost clerk. In 1941 he was promoted to supervisor of cost accounting, holding that position until this change.

• **C. H. Welch** has been appointed plant manager and **J. E. Gickler**, superintendent of the Alloy Cast Steel Co., Marion, Ohio. Mr. Welch has been superintendent of the company since 1928. Prior to that time he was associated with Commercial Steel Casting Co. as plant engineer. In the new post he succeeds **W. A. Dorsey** who recently retired as vice-president and works manager. Mr. Gickler, who takes over the post left vacant by Mr. Welch's promotion, has been assistant superintendent of the company since 1942.

• **George W. Kurachek**, formerly foundry metallurgist with the Wright Aeronautical Corp., is now affiliated with the Castalloy Co., Inc., Cambridge, Mass., as assistant foundry superintendent.

• **Emil Kern** has been appointed chief engineer for Allegheny-Ludlum Steel Corp., with headquarters at Brackenridge, Pa. He came to the United States from Germany in 1926 as an exchange engineer, and joined the Mesta Machine Co., where he remained until 1945. Before coming to Allegheny-Ludlum he was with the Reynolds Metals Co. as chief mechanical engineer.

EMIL KERN, chief engineer, Allegheny-Ludlum Steel Corp.



• **Lt. Com. William R. Bowen** has returned to Farrel-Birmingham Co., Inc., Ansonia, Conn., and is now manager of the company's branch sales office at Akron, Ohio. He succeeds **Harry D. Temporal** who will manage the Farrel-Birmingham office in Chicago. Before entering the service Mr. Bowen was assistant general purchasing agent for the company.

• **E. G. Schroeder** has been appointed to head the Electric Products Co.'s new district office at Detroit. He had been associated with the New York State Electric & Gas Corp. and with the General Electric Co.

• **John McElroy** has been appointed assistant advertising manager of Copperweld Steel Co., Glassport, Pa. He was formerly with the sales promotion dept. of Standard Brands, Inc. Prior to that he was associated with American Cyanamid Co. in the Research Div.

• **P. J. Laux** has been appointed assistant to the president and **Ralph R. Irwin** has been made sales manager of Ainsworth Mfg. Co., Detroit. Mr. Laux was associated with Ford Motor Co. and Timken-Detroit Axle. Mr. Irwin had previously been with Studebaker Corp. and J. H. Gould Co. He joined Ainsworth in 1939.

• **J. C. E. Williams** has been named manager of converter sales, and **E. J. Dunlavy, Jr.** has been assigned to the fabricating field of Pliofilm sales dept. of Goodyear Tire & Rubber Co., Akron, Ohio.

• **George W. Walker** has been named consultant for the Ford Motor Co., Dearborn, Mich. Mr. Walker has severed his former association with the Nash-Kelvinator Corp. for whom he has designed automobiles since 1940.

• **Frank Brunner**, former assistant superintendent of the Stearns Magnetic Mfg. Co.'s main factory, Milwaukee, has been appointed superintendent of the firm's brake plant.

• **E. E. Jagmin**, former superintendent of production at Ampco Metal, Inc., Milwaukee, has been appointed general superintendent of all manufacturing facilities. He has been with Ampco, since 1929.

PERSONALS



P. D. SCOTT, general sales manager, Alloy Rods Co.

• **P. D. Scott** has been appointed general sales manager of the Alloy Rods Co., York, Pa. He was formerly associated with the Welding Equipment & Supply Co. in Detroit as sales engineer. He joined the Alloy Rods Co. in January as manager of the Tool Steel Electrode Div.

• **Rear Admiral Lawrence B. Richardson**, deputy and assistant chief of the Navy Bureau of Aeronautics, will become associated with Curtiss-Wright Corp., New York, as executive assistant to the president. Admiral Richardson, who has recently retired after 29 yr of active naval service, will assume his duties with Curtiss-Wright on Sept. 1.

• **Thomas W. Nale**, formerly plant physician of the South Charleston works of Carbide & Carbon Chemicals Corp., has been appointed assistant manager of the industrial toxicology dept. of Union Carbide & Carbon Corp., New York.

• **Philip O. Geier** has retired as an active officer of the Cincinnati Milling Machine Co., Cincinnati, but will continue on the board of directors. Mr. Geier has been chairman of the board and treasurer. **Ferris M. Angevin** has been elected treasurer and **Millard Romaine** has been named to succeed Mr. Angevin as secretary.

• **W. M. Greene** has been elected president of the Luminite Products Corp., Salamanca, N. Y., filling the vacancy caused by the death of **John Walrath**, former president and treasurer. Prior to the election, Mr. Greene was vice-president. **John F. Vosburg** has been elected vice-president and secretary. **Harry C. Witherell**, former secretary, has been elected treasurer and assistant secretary.

• **R. E. Wagenhals**, formerly quality control engineer, has been appointed director of quality control for all bearing divisions of the Timken Roller Bearing Co., Canton, Ohio. He will coordinate all quality control activities involved in the manufacture of Timken bearings. **Sherman R. Lyle**, formerly in the Timken steel sales dept., has been named sales engineer for the Cleveland district. **William E. Bryden**, former New York district sales engineer before becoming a member of the Steel Div. of the War Production Board, has been appointed sales engineer for the Chicago district. **Alfred J. Kinnucan**, prior to his service in the Navy, was associated with the Empire Finished Steel Corp. He has been named New York district sales engineer for the Timken Roller Bearing Co.

• **W. D. Moore**, for 22 yr president of American Cast Iron Pipe Co., Birmingham, has retired. He is succeeded by **C. D. Barr**, vice-president, and associated with the company since 1908.

• **V. G. Schwenke** has been appointed service manager for the Ditzler Color Div. of the Pittsburgh Plate Glass Co., Pittsburgh. He has been associated with the Ditzler Color Div. as a service engineer for the past 10 yr.

• **Gov. Raymond E. Baldwin** and **Austin R. Zender**, vice-president in charge of sales, were named to fill vacancies on the board of directors of Bridgeport Brass Co., Bridgeport, Conn. **M. K. Schnurr**, comptroller, has been named a vice-president of the firm.



SIDNEY E. McCrum, advertising manager, Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp.

• **Sidney E. McCrum** has been appointed advertising manager of Wickwire Spencer Steel Div. of the Colorado Fuel & Iron Corp., New York. Mr. McCrum was assistant advertising manager of Wickwire Spencer Steel Co. prior to the merger of that company with the Colorado Fuel & Iron Corp.

• **Lt. (j.g.) Edward B. Westall** has been released from the U. S. Naval Reserve and has joined the Hanford Foundry Co., San Bernardino, Calif. Prior to entering the Navy, he was with Warman Steel Casting Co. as metallurgist.

• **W. Stewart Clark** has retired as manager of manufacturing for the General Electric Co.'s appliance & merchandise dept., Bridgeport, Conn., and **Carl M. Lynge**, general works manager of the GE Bridgeport plant, has been appointed to succeed him.

• **Raymond H. Van Saun** has been appointed manager of the Mexico City plant, Rheem de Mexico S.A., who operate the new company in cooperation with Rheem Mfg. Co. Prior to joining Rheem as assistant plant manager of the Richmond, Calif., plant, Mr. Van Saun was associated for 10 yr with Container Corp. of America.

PERSONALS

• **Alfred C. Howard**, former general manager of Fairbanks, Morse & Co., has been named vice-president in charge of manufacturing of Eversharp, Inc., Chicago. **Edwin P. Hart** has been appointed controller of the company, and **John W. Dean, Jr.**, manager of the company's new Long Island City, N. Y. plant. Mr. Hart joined Eversharp after 2 yr as a staff specialist with Frazer & Torbet. Mr. Dean, prior to his appointment as manager of the Eversharp plant in New York, was associated for 18 yr with the Firestone Steel Products Co. and the Firestone Aircraft Co.

• **Michael S. Palmer**, former assistant secretary-treasurer of the Milwaukee Stamping Co., Milwaukee, has been elected vice-president of the firm. Other promotions include: **Daniel Dobrogowski**, appointed chief engineer from former assistant to plant superintendent; **Raymond J. Buettner**, former chief engineer, now plant superintendent; **Earl D. Miller**, former production manager, now factory manager; **John F. Svoboda**, assistant chief engineer; **George W. Kukla**, production planning manager; **George Weydenhammer**, assistant plant superintendent; and **Elmer Lambert**, sales engineer on specialty work.

• **A. J. Baker** has been appointed manager of rubber thread sales of the B. F. Goodrich Co., Akron, Ohio, succeeding **Karl Ryan**, resigned. **C. J. Phillips**, production superintendent of the Clarksville, Tenn., plant, succeeds Mr. Baker as manager of the Du Bois, Pa. plant.

• **W. Stewart Clark**, manager of manufacturing, General Electric Co.'s appliance and merchandising dept., has retired. He is succeeded by **Carl M. Lynge**, general works manager of the company's Bridgeport plant.

• **T. W. Allen** has been appointed manager and **Arthur Mroz**, sales engineer of the Job Welding Div. of Progressive Welder Co., Detroit.



DR. J. Z. BRIGGS, metallurgical staff, Climax Molybdenum Co.

• **Dr. J. Z. Briggs** has joined the metallurgical staff of the Climax Molybdenum Co., New York. Previously she was a metallurgist for the Crucible Steel Co. of America.

• **John A. Wallace** has been appointed director of traffic of Ford Motor Co., Dearborn, Mich. Mr. Wallace returned to Ford from Packard Motor Car Co. where he was traffic manager. **Harold E. Joy** has been appointed assistant purchasing agent of Ford. He comes from the Dodge Div. of Chrysler Corp. and has held various executive positions in Purchasing, Production and Planning Divs. since 1919. During World War II he was in charge of all purchases for the Chrysler Tank Arsenal.

• **Francis B. Lewis** has been appointed to the newly-created post of general safety agent for the Union Pacific Railroad, Omaha, Neb. A mechanical engineer with the company, he will have charge of safety operations throughout the system.

• **Hugh J. Phillips** has been named general manager of Rienecker Industries, Inc., Ferndale, Mich. He has been with General Motors Corp. for the past 19 yr.

• **Alvin Haas** has been appointed vice-president and general manager of the American Well Works, Aurora, Ill.* Mr. Haas comes to this company after 15 yr as general manager of the Yates American Machinery Corp. **W. N. Remsburg** has been named chief engineer of the Sanitary Div. He has been associated with the Works for 12 yr.

• **R. W. Gillmore** has been named manager of the new branch office of Allis-Chalmers Mfg. Co., Evansville, Ind. Mr. Gillmore has been associated with the Allis-Chalmers Indianapolis district office since 1935, where he served as sales engineer. **Anthony Lebesch** has been promoted from superintendent of the No. 1 gray iron foundry of the Allis-Chalmers Mfg. Co. in Milwaukee to assist the superintendent of the company's No. 1 and No. 2 brass foundries.

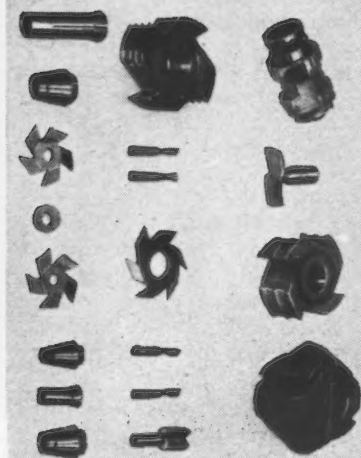
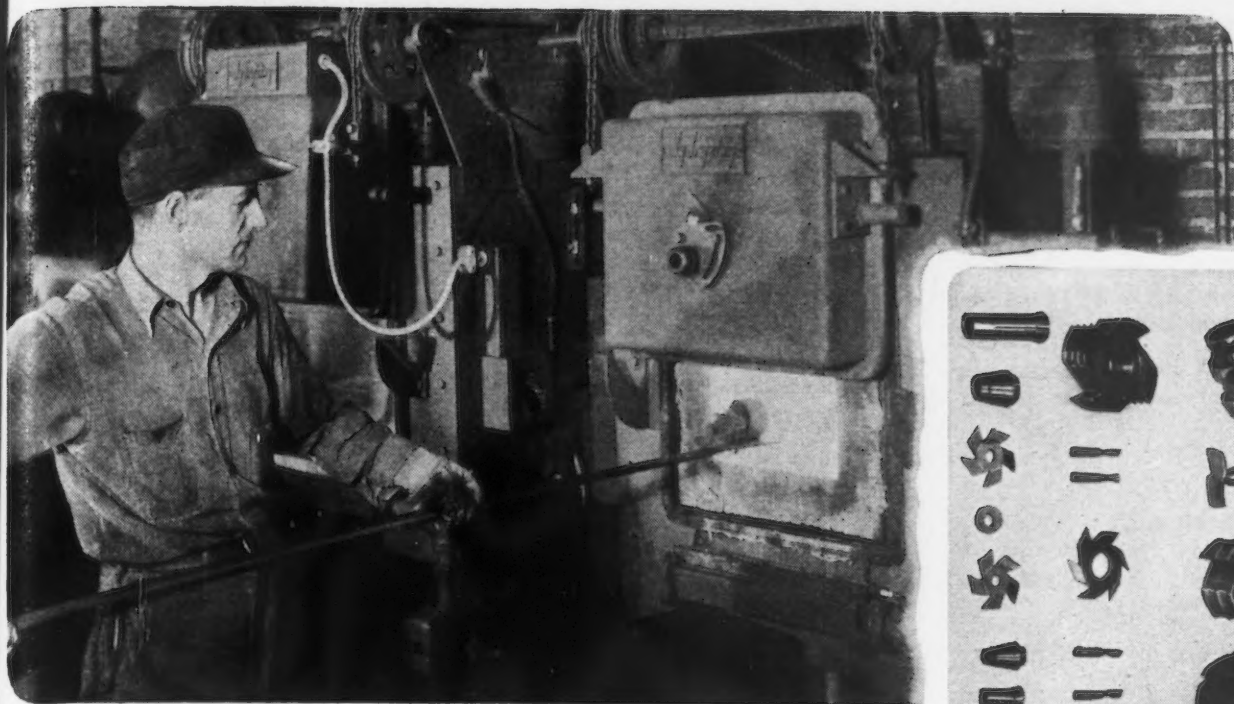
• **Lewis W. King** has been appointed manager of roll sales of the Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa. He has been with the company for the past 9 yr. He is also roll designer and sales engineer of rolling mill machinery.

OBITUARY...

• **Ellsworth M. Rust**, 67, vice-president of the Rust Engineering Co. of Pittsburgh, died recently.

• **Louis J. Desparois**, 51, district sales manager for Pickens Nather & Co., St. Louis, died recently of a heart ailment.

• **William J. Coane**, 78, after a long illness died July 31. Up to the time of his recent retirement he was for 33 yr vice-president of the Ajax Metal Co., Philadelphia, and at the time of his death still held the office of vice-president of the C. Howard Hunt Pen Co., Camden, N. J.



**ONSRUD hardens high speed cutters
without Scale, Carb, or Decarb
in LINDBERG HYDRYZING FURNACES**

Doubles Production—Eliminates Rejects!



Erick Olsen,
Plant Supt. at
Onsrud says:

**"WE GET MUCH BETTER HARDNESS UNI-
FORMITY, AND WE AREN'T BOTHERED WITH
SCALE OR DECARB. WE'VE DOUBLED OUR
HEAT TREAT PRODUCTION, AND WE DON'T
HAVE ANY HEAT TREAT REJECTS ANYMORE.
—AND MAINTENANCE IS WAY DOWN."**

In July 1945 Onsrud Machine Works, Chicago, manufacturers of high speed cutters for routing, shaping, and carving, installed two Lindberg Hydrying furnaces,—a preheat and a high heat, along with a Lindberg HYCO atmosphere generator. This equipment replaced two conventional non-atmosphere box type furnaces of the same size.

Month in and month out production shows that Hydrying hardening lengthens the already long operating life of Onsrud cutters.

*Daily hardening production on this Onsrud 1/4" Router
Bit was increased from 500 to 1000. Some of the reasons:*

- ... With Lindberg furnaces, the entire hearth area can be used. This is because both the front and back areas of the hearth reach and hold the same temperature as the center area.
- ... Lindberg Furnaces reach hardening heat 25% quicker.
- ... By eliminating scale, the sand blasting operation was done away with.
- ... Rejects due to hardening were cut from an average of 50 cutters per 1000 to zero. (This is a fact vouched for by Mr. Olsen.)

Lindberg Engineering Company, 2452 W. Hubbard St., Chicago 12, Ill.

Write for bulletin 95-hs, "Lindberg Hydrying Furnaces," and a reprint of an article, "Heat Treatment of High Speed Steel Cutters."

LINDBERG FURNACES

Dear Editor:

CEMENTED IRON POWDERS

Sir:

I note from the article, "Cemented Steels," in the May 2 issue recent advances in the art of powder metallurgy refer to cementing iron powder compacts with copper. I find in my files a copy of a report which I wrote in 1927 on the Hailes process using steel filings made into compacts and cemented together with copper. In this process steel chips, or filings, were hydraulically compressed at about 20,000 psi in a mold of the desired shape. The pressed filings were then placed on a copper plate in a furnace having a hydrogen atmosphere and the temperature raised until the copper melted. The pressed filings act as a wick for the molten copper which fills in the voids and brazes the particles together.



Samples of this work are shown in the accompanying illustrations. One (left) is a small coin die made with very fine tool steel filings (quenched in water from 1450°F; hardness, about RC 40). The other sample (right) is a small Bakelite mold made with fine turnings and filings mixed before pressing. The microstructure of the coin die showed a uniform distribution of copper patches with small holes, mostly in the copper patches. The Bakelite mold structure revealed very large copper patches which were quite porous, as was the steel matrix. Microexamination of the pieces made in this manner indicated that the percentage of copper absorbed is dependent upon the fineness of the filings used and the pressure used in compacting. For additional density of final product, Mr. Hailes suggests a hot pressing of pieces to final shape after brazing or "cementing."

Sam Tour & Co., Inc.
New York 6

SAM TOUR

HEAT TREATMENT

Sir:

Please send me the tear sheets of "Heat Treatment of Stainless Steels" which appeared in the May 30 issue.

K. G. PRESSER
Chief Metallurgist

National Supply Co.
Springfield, Ohio

NATIONAL WELDING

Sir:

In the July 11 issue, p. 55, you show a picture of a welding machine produced by National Electric Welding Machine Co. We have a welding problem of our own and we believe that if you are able to furnish us with their address we could contact them so they could send us their representative who in turn would be able to advise us.

L. R. WEINE
Treasurer

Joseph Weine Corp.
Brooklyn

● The address of National Electric Welding Machine Co. is 1800 Trumbull St., Bay City, Mich.—Ed.

RAZORBLADE MANUFACTURE

Sir:

I am a student in mechanical engineering at the University of Virginia and am writing my term paper on the manufacture and hardening of razor blades. The Industrial Arts Index indicates that your publication contains the articles "Manufacturing Safety Razor Blades," May 25, 1933, "Testing Safety Razor Blades," June 22, 1933, and "Supplies Equipment for Heat Treating 100,000 Safety Razor Blades Daily," May 17, 1934. . . I would appreciate your forwarding these issues.

G. A. GELOTTE

Charlottesville, Va.

● Unfortunately our file of those issues is depleted. However, we checked with H. W. Wilson Co., a back number magazine dealer and managed to obtain two of the three issues you requested. Most public libraries and engineering school libraries maintain bound files of THE IRON AGE from which photostats may be made if necessary.—Ed.

ANODIZING BATHS

Sir:

We have read with interest the article "Throwing Power of Anodizing Baths" by Robert S. Herwig and Albert Leigh, appearing in the Dec. 20, 1945 issue, pp. 51-53. Can you furnish us a reprint of this article.

K. M. HUSTON

Research Chemical Engineer
Rustless Iron & Steel Div.
American Rolling Mill Co.
Baltimore 13

● Reprints have not been made of this article. However, tear sheets have been mailed you.—Ed.

HOW TO WELD ALUMINUM

Sir:

With reference to the July 4 issue, we would appreciate receiving two copies of the pages on "How to Weld Aluminum."

J. R. BROWN

International Machinery Co.
Hamilton, Ontario

UNRRA UNIVERSITY

Sir:

The international UNRRA University Munich, in the American occupation zone (Bavaria, Germany), with faculties for mechanical and civil engineering, wants catalogs, booklets and samples of American wares.

H. G. GASZYNSKA
Director

UNRRA University Munich
c/o UNRRA Team 108
APO 757
U. S. Third Army

RESEARCH ON CASTINGS

Sir:

On p. 57 of the July 11 issue you mention an article captioned "Additions Improve Cast Steels." We are desirous of receiving a copy of this report No. PB-13748. Please advise where it can be obtained.

A. G. THIEL
Purchasing Dept.

A. Finkl & Sons Co.
Chicago

● We suggest that you write direct to the Office of Technical Service, Dept. of Commerce, Washington 25, for a copy of this report.—Ed.

ELECTROPLATING PATENT

Sir:

A statement was made on the "Newsfront" page for the week of July 4 regarding a patent on the electroplating of nickel and chromium. Can you give us the number of this patent?

AUGUSTUS JONES

Rensselaer Polytechnic Institute
Dept. of Metallurgical Engineering
Troy, N. Y.

● This patent, No. 2,402,834, was issued June 25 to William Nactman.—Ed.

SIMPLIFYING CONSTRUCTION

Sir:

You published an article entitled "Simplifying Construction by Automatic Stud Welding" in your June 27 edition. Please send us the address of the Nelson Specialty Welding Equipment Corp., as we would like to contact them regarding their process.

B. L. SCHWALLER

Manager, Valve Production Dept.
Durabla Mfg. Co.
New York 6

● The Nelson Specialty Welding Equipment Corp.'s address is 144 Peralta Ave., San Leandro, Calif.—Ed.

ANTIMONY IN STAINLESS STEELS

Sir:

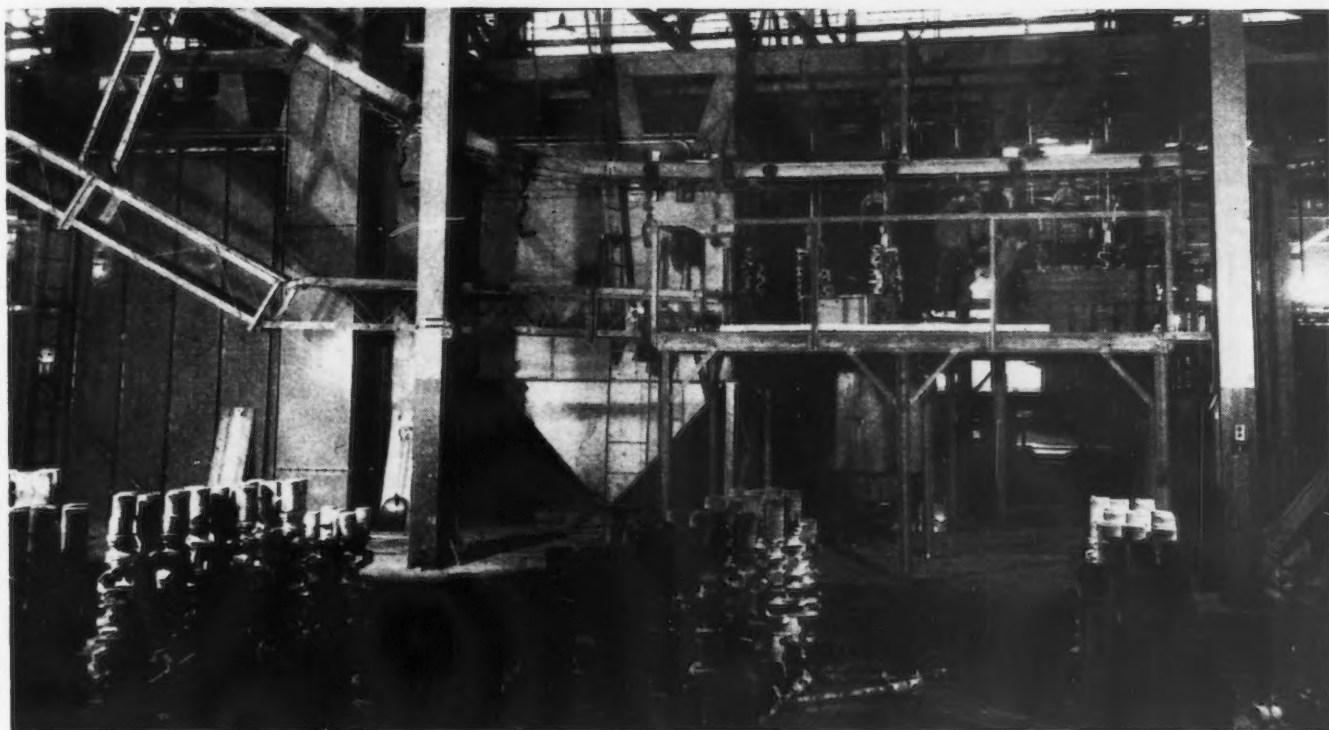
We have read with interest the article "Antimony in 18-8 and Plain-Chromium Stainless Steels" appearing in the May 16 issue, pp. 44-50. Can you furnish us with a copy of this article?

K. M. HUSTON

Research Chemical Engineer
Rustless Iron & Steel Div.
American Rolling Mill Co.
Baltimore 13



250 cast crankshafts cleaned hourly in this *Wheelabrator* monorail cabinet



Pushing through a quick change-over from cast shells to automobile crankshafts, Auto Specialties Manufacturing Co. ran into a major cleaning problem. Equipment which had proved so highly effective for cleaning shells in war was unsatisfactory for cleaning crankshafts, due to the manual handling and excessive cleaning time required.

American Engineers Solve Problem

American Engineers, answering the distress signal, made a thorough investigation of production requirements, and then designed and installed a Wheelabrator Cabinet which cleans more than 75 tons of green and annealed crankshaft castings in less than eight hours. 250 shafts are cleaned every hour.

A heavy duty Monorail Conveyor System carries the castings from the shakeout to and through the Wheelabrator Cabinet. Four Wheelabrator Units, each throwing more than 300 pounds of abrasive per minute, are staggered at carefully determined heights in the cabinet to give complete blast coverage to all parts of the work. The castings are rotated within the abrasive field to further insure that all surfaces of the shafts are thoroughly cleaned.

Special Cabinet Saves Cleaning Time and Labor

The Special Cabinet and Conveying System has reduced the manual handling of castings to a minimum, it has resulted in more thoroughly cleaned castings and it has kept pace with all production goals.

American Engineers will solve your cleaning problems too. They will be glad to give you the benefit of their recommendations without the slightest obligation to you.

The Answer To Your Problem

The most efficient and economical way to handle your cleaning problem can be determined by sending products to our laboratory, where equipment of all kinds is available for testing purposes. Avail yourself of this service today — doing so involves no obligation whatever.



American
FOUNDRY EQUIPMENT CO.

510 S. BYRKIT ST.
MISHAWAKA, INDIANA

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

This Industrial Week . . .

- **Steel Operations Continue High**
- **Scrap Shortage Expected to Ease**
- **Basing Points Under Attack Again**

DESPITE dire predictions by high officials that steel operations would be cut because of the scrap and freight car shortage, the steel industry set up to operate at a rate of 90.5 pct of capacity for the third consecutive week. This high level of operations belies the many statements that curtailments were cutting steel production and harks back to the many gloomy wartime prophecies on steel output that had to be quickly and quietly interred because the industry did what its members said was impossible.

There has been an increase in the production of pig iron during the past week, with blast furnaces being brought into operation at several points. Another unit has been blown in at Chicago and the Troy furnace of Republic came into production following the settlement of the Adirondack miner strike.

The iron situation is greatly confused. At least one blast furnace operator in the East was instructed to switch from basic to foundry iron, while the stove manufacturers and foundries in the South are protesting to CPA because the pig iron allocation scheme places virtually the entire southern output under the certification plan. It is estimated that about 30 pct of the northern operators' output falls under the plan. Among the producers hardest hit by the iron allocation plan is the automotive industry, and it is feared that the lack of pig iron for automotive castings will begin to cut automobile production which has only begun to hit its stride.

THE reinauguration, probably on Oct. 1, of the CPA's MM and CC priority system will inevitably dislocate mill schedules and throw out of those schedules many customers that steel producers feel should be supplied with steel. The insertion of priority orders into mill schedules, which have changed those schedules on an almost day-to-day basis, has taken a toll on steel production. One large producer reported that only 90 pct of the planned production was reached as of July 1 because of reshuffling of rolling and melting schedules.

Producers are adhering to their quota system on steel production and are refusing to think about 1947 business except where material is needed to produce contract building jobs. Shapes and plates for such contract jobs have been promised in 1947 with some deliveries scheduled as far ahead as April. The actual orders, although not on mill books, are held with the understanding that the tonnage will be inserted once the books are opened. To some extent, material for railroad car builders is handled in the same manner.

Producers are protesting the CPA export priority plan claiming that in some instances they are being loaded with more than their share of allocation. The original quota for export, set at 70,000 tons a month starting in September, limited allocations to specific producers at 2 pct of their monthly output. CPA directives far exceed the 2 pct. Specifically mentioned were such items as concrete reinforcing bars, light structurals, plates and galvanized and cold-rolled sheets. Producers stated that the September quota on concrete bars was 17,000 tons, against a normal industry output of about 100,000 tons a month.

SCRAP and freight cars remain the most critical items that threaten steel output, along with a future shortage of coal. Indications are that the scrap crisis has just passed its peak, but scrap nevertheless will remain a serious problem for some time. Mills are crying long and loud for scrap. However, the fact that fabricators' scrap lists are beginning to look better and that the anticipated shipbreaking program will begin to yield scrap by midwinter tend to give the industry confidence that the worst is past.

Consumers of scrap may shortly expect a substantial increase in supply from a source that has existed but which has not yet been appreciably tapped. It is expected that this scrap may begin to show within the next 30 days and a substantial part of it will be foundry grades. Foundries are in a particularly bad position, having cleaned out much of the available cast during July at highly inflated prices. Any new source will be more than welcome.

Sharpshooting at the basing point system has started again in Washington. For the July issue of the Dept. of Commerce's publication *Domestic Commerce*, E. L. Davis, a recent appointee to the Federal Trade Commission, wrote an article criticizing the single and multiple basing point plans used by industry throughout the country. This is believed to be the opening gun for the coming hearings by the subcommittee of the Small Business Committee of the House, where FTC and the Dept. of Justice will renew their attack on the basing point system. FTC will continue its action against the system under the Clayton and the Robinson-Patman Acts, while the Dept. of Justice carries on its crusade under the Sherman Anti-trust Laws. While there is considerable undercover rivalry between the two government units as to which shall initiate action against the system, the bets are on FTC since it is a child of Congress whereas the Dept. of Justice reports to the President.

• **SPEEDIER STEEL PROCESSING**—The trend toward faster steel processing continues, the practice promising further savings in conversion costs. Bethlehem's new 68-in. ten stand hot rolling mill, now completed by Mesta, will finish at extremely high speed. The hot coiler will handle up to 24 tons, twice the capacity of the coilers now in use. This strip will be rolled from a 24-in. slab. The Rust Co. has designed three record-size slab-heating furnaces for this mill to permit rolling 150,000 tons of strip per month. National Tube's new seamless mill will finish 4½-in. tubing at a speed of 2000 fpm, a rate several times faster than conventional practice.

• **CARBIDE TOOL SALES GAIN**—The market for carbide tools is picking up after several dull months. The demand for special purpose carbide tools has increased noticeably although sales of standard tools remain low in volume. An increase has been noted in the number of orders for special forming tools and compacting dies for abrasive materials such as powdered iron, porcelain and abrasive drugs. Considerable research work is currently being directed at finding nontool uses for carbides and progress is reported in the discovery of new and lower cost compositions. Order backlog is small because of the present substantial excess capacity of the industry and the ample supply of standard tools on hand. Many surplus tools in government warehouses are reported to be larger than regular commercial sizes and therefore not economically adaptable to commercial production. Most automobile producers ordering machine tools are stipulating that the machines must be capable of operating with carbide tools.

• **GEAR SALES UP**—The gearing industry, as represented by the members of the American Gear Manufacturers Assn., showed an increase in volume of sales for June 1946 as compared with May 1946 of 2.6 pct. This does not include turbine or propulsion gearing. The index figure for June, was 321.

• **UNITED KINGDOM SHIPBUILDING**—Continued expansion in the amount of merchant shipping under construction in Great Britain and Ireland to the highest level since 1922 is recorded by Lloyd's register of shipping. At the end of June new tonnage under construction of 1,764,943 tons gross was 88,840 tons more than at the end of March, and 377,650 tons more than at the end of June last year. It is reported that more than half the 3,277,325 gross tons of world shipping under construction at the end of June is being built in Great Britain and Ireland.

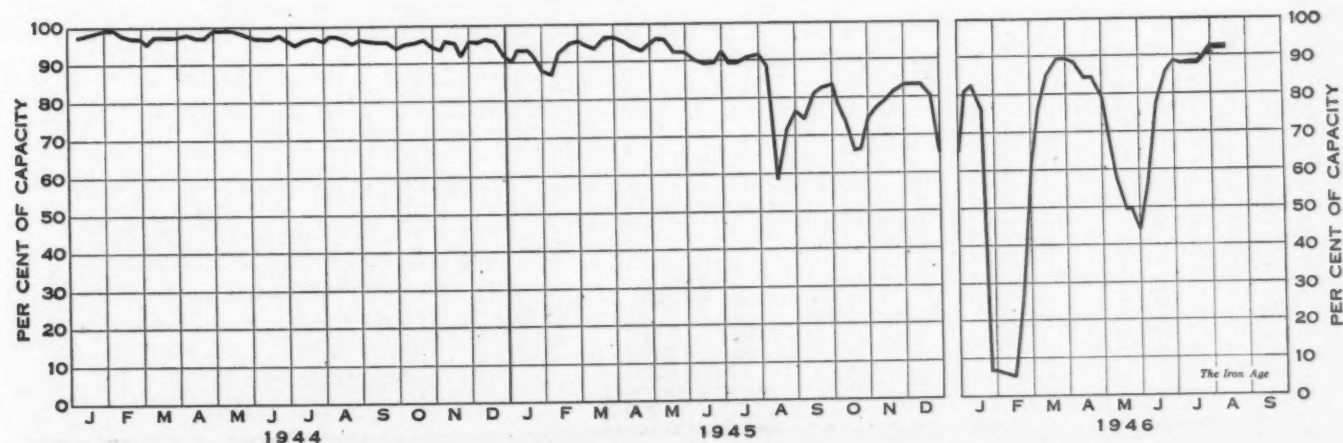
• **BRIGHT SPOTS**—Solid booking of steel products on a quota basis plus closed books on next year's schedules has created a delivery picture that is bleak if not blank. On the brighter side are the delivery promises of products not on a quota basis. One large source will promise electric furnace alloys, any size, in 6 weeks; openhearth alloy, 6 months, in bars under 1 in., 2 months in bars over 1 in.; stainless steel sheets, 4 months; bars 2 to 3 months; low alloy, high strength plates or sheets, 2 to 4 months deliveries.

• **LABOR BOTTLENECK**—Republic's new electric furnace alloy plant in Chicago brought the third 70-ton furnace into operation July 29. Six of the nine melting units are capable of use but operations have been restricted principally because of manpower shortages, particularly in the rolling mills. Bar mills have only had sufficient personnel to run one turn per day.

• **AUTO STEEL CRITICAL**—Automobile producers are living from hand-to-mouth so far as steel and pig iron is concerned. Ford is making ingots in the electric furnace and sending them to Great Lakes to be rolled into wide sheets. Packard can see no end to the difficulty they are having obtaining steel for bodies; other producers are having similar difficulties although the shortage may not be so acute. The possibility of substituting low alloy high tensile sheets for carbon grades is being seriously considered where rigidity is not a factor and lighter gages can be used. Kaiser-Frazer reports steel is their most serious supply problem at the moment. At least four of the non-integrated steel mills which normally ship into the Detroit area are unable to obtain ingots and have accepted no new orders for sheets since January. Automotive foundries are operating on 4 to 5-day supply of pig iron and only the fact that deliveries have been regular has kept these foundries in continuous operation.

• **LABOR OUTPUT DROPS**—Decreased labor productivity is an important factor limiting output of one large supplier of sheets for the automotive industry. With equal manpower and greater facilities than were available before the war, this supplier is able to produce only 48,000 tons per month compared with 65,000 tons for the pre-war period. A major factor limiting operations is the decreased efficiency of crews which rebuild furnaces and maintain electrical equipment. Morale of workers is reported to be good but able men who went off the job during the war have not returned to work and many cannot even be located.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
July 30.....	99.0	90.0	87.5	87.0	93.0	101.0*	94.0	99.0	101.0	60.0	101.5	55.0	89.5	90.5
August 6.....	98.0	90.0	88.0	87.0	95.0	102.0	94.0	99.0	100.0	70.0	106.0	55.0	89.5	90.5

* Revised.

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Auto Output Climbs Despite Labor and Material Crises

Detroit

• • • A review of automobile production figures through July 27, 1946 and for the week ended July 27 has many interesting surprises for the layman who has not been following recent developments. Among other things, estimated production figures taken from the Automotive Daily News indicate that while the number of motor cars and trucks produced in the United States and Canada was only 37.4 pct of the total reported for the same period of 1941, one producer—Hudson—will build more cars and trucks during the first seven months of this year than were turned out by the same company during the corresponding period of 1941. Nash production also compares favorably with 1941 output, and present indications are that production through July 27 will be approximately 93 pct of the 1941 output. It is also interesting to learn that the so-called independents—Nash, Studebaker, Hudson, Packard, etc.—are currently getting 17.2 pct of the passenger car business as compared with 13.5 pct in 1941.

The poor showing for the industry as a whole for the first seven months of this year is largely accounted for by the prolonged strike which cut GM production to 22 pct of the 1941 level and the Ford shutdown, caused by a parts and materials shortage, which held the Ford output to 37 pct of the 1941 figure.

Chrysler made the best showing among the "Big 3," turning out 44 pct as many cars as were assembled during the corresponding period of 1941.

During the week ended July 27, the automobile industry established a new peak for the third consecutive 5-day period, average daily output of cars and trucks in U. S. and Canada reaching approximately 17,000 units, a figure which, if it could be maintained for 250 days in a year would result in U. S. and Canada car and truck production of 4,250,000 units. Thus, automobile production levels have now been raised within sight of the 5 million per year vehicle goal so many ob-

servers have been talking about but which, in the midst of parts shortages and strikes, has seemed far beyond the grasp of the motor industry.

While the problem of the motor industry was once two-fold: namely (1) to gear up assembly lines to a point where large numbers of cars and trucks could be assembled and (2) provide adequate and balanced banks of parts and supplies, the production problem now seems to be largely a matter of maintaining a satisfactory flow of materials. The automobile industry has re-established its ability to reach high production levels; it has yet to demonstrate its ability to maintain high rates of production.

Two factors in the present automobile production picture are worth noting. One is the fact that the larger independent companies—Hudson, Nash, Studebaker and Packard—have all made a better showing than the industry as a whole, Hudson and Nash having for all practical purposes duplicated their 1941 performances

during the first seven month of this year. Studebaker has also made an excellent showing, turning out 61 pct of its 1941 January-July production in the same period of 1946.

Truck producers have done well. It is significant that U. S. truck production through July 1946 accounts for 33.4 pct of this year's output; the comparable figure for 1941 is 24.8 pct. With truck production lines practically established on V-J Day it was natural that truck producers should get off to a fast start and present indications are that this initial advantage is being maintained.

After a very bad beginning, GM has come back fast and for the week ended July 27 average daily output of cars and trucks for U. S. and Canadian plants totaled 6000 units, compared with 3518 for all Chrysler Divisions and 3316 for Ford, Lincoln and Mercury assemblies.

Based on last week's production, Chevrolet had a substantial lead over all other individual makers, turning out on an average day

ESTIMATED CAR & TRUCK PRODUCTION

U. S. & CANADA

Source: Automotive Daily News

	January 1 to July 27, 1946	January 1 to July 26, 1941	1946 as Percent of 1941	Daily Rate Week Ended July 27, 1946
GENERAL MOTORS				
Buick.....	40,909	245,128	16.7	785
Cadillac.....	8,371	44,137	19.0	159
Chevrolet.....	215,681*	893,457*	24.2	3,595*
Oldsmobile.....	30,643	171,756	17.8	550
Pontiac.....	37,581	212,484	17.7	625
GMC.....	10,236*	.....	.....	296*
TOTAL.....	343,421*	1,566,962*	21.9*	6,000*
CHRYSLER				
DeSoto.....	36,805	71,643	51.4	325
Dodge.....	154,910*	250,464*	61.9*	1,381
Plymouth.....	113,488	357,257	31.8	1,387
Chrysler.....	38,745	105,043	36.9	425
TOTAL.....	343,948*	734,407*	43.9*	3,518*
FORD				
Ford.....	233,417*	613,670*	38.0*	2,851*
Lincoln.....	4,171	12,646	32.9	90
Mercury.....	24,947	78,831	31.7	375
TOTAL.....	262,535*	705,147*	37.2*	3,316*
NASH				
Nash.....	49,123	52,985	92.7	524
STUDEBAKER				
Studebaker.....	50,415*	82,905*	60.8*	587*
HUDSON				
Hudson.....	49,017*	46,633*	107.0*	633*
PACKARD				
Packard.....	16,159	42,929	37.7	244
ALL OTHERS				
Others.....	203,920*	261,838*	81.0*	2,101*
TOTAL.....	1,318,538*	3,533,006*	37.4*	16,933*

* Includes Trucks.

3595 cars and trucks in its American plants; Ford was second with an average daily output of 2851 and Plymouth and Dodge were tied at 1387 and 1381 respectively.

Based on average daily output for the week ended July 27, other individual car makers ranked in the following order: Buick 785; Hudson 633; Pontiac 625; Studebaker 597 and Nash 524.

The automobile industry is, of course, laboring under no delusions about its ability to maintain present production levels. Seat cushions, automotive bolts, pig iron, and hot and cold rolled automotive strip and sheet are reported to be in very short supply and only the fact that regular deliveries have been maintained and extraordinary measures were taken to insure the flow of materials has kept many plants in operation. The recent decrease in the number of strike-bound suppliers plants has been helpful to GM but the sobering fact is that the number of such strikes jumped from 55 to 60 during the

past two weeks. This would scarcely indicate that the present rate of production is going to be maintained.

With all the clouds that over-

hang the automobile horizon, it is interesting to find that the automobile industry, for a week at least, was operating within reach of anticipated production levels.

Initial Shipbreaking Plan Will Yield 700,000 Tons of Steel Scrap

Washington

••• Plans for scrapping 280 ships to start off a huge government-sponsored shipbreaking program, were announced by CPA. It is estimated that these ships will provide only about 700,000 tons of scrap. However, future plans call for the scrapping of an additional 1000 ships. The recently announced government drive to obtain scrap from federal agencies, as well as from industry and farms, combined with the shipbreaking program should provide enough scrap to place the steel mills in a reasonably sound position over the next 12 months, according to CPA.

More than 2,000,000 tons of scrap per month must be obtained to keep the mills operating at the current rate of 90 pct. CPA says that more than 24 openhearth furnaces are shut down because of the scrap shortage, and more will be down unless this shortage is relieved promptly, according to CPA.

Of the first 280 ships to be scrapped, 200 are owned by the Maritime Commission and 80 are Navy ships. Of the additional ships, many will be old ships turned in as trade-ins by private firms.

The ship scrapping plans were outlined to members of the newly formed Ship Breaking Industry Advisory Committee and also to a conference of representatives of steel mills, ship building companies, ship wreckers and scrap dealers. Both meetings were held on July 30.

Many operating problems still face CPA and industry in obtaining the ship scrap and at the same time safeguarding the facilities of the Navy, the Maritime Commission and the War Assets Administration.

The primary problem, according to CPA, is the selection of shipbreaking companies to handle the job, based on experience and ability in this work. Other problems include the selection of yards to be used for shipbreaking, the mechanics of insuring prompt delivery of the scrap to the steel mills, and the proper terms for leasing the government facilities. Also, some plan must be worked out to enable the successful bidders for scrapped ships to obtain access to shipyards near ports where the ships are berthed.

Because of the high cost of shipping scrap long distances, operations must be confined to areas near steel mills. Therefore, shipbreaking may be narrowed to approximately 10 areas: Seattle; the San Francisco Bay area; Los Angeles; Houston, Texas; Mobile, Ala.; Newport News, Va.; James River, Del.; the Baltimore area; Philadelphia; and New York Harbor.

SAVED BY THE SHELL: This posed picture shows precious scrap being picked up by a magnet in the Studebaker Foundry at South Bend. Less than a year ago these shell casings were ticketed for Japan. When scrap like this goes into cupolas and eventually winds up as passenger car engine blocks one might say that industry is "beating swords into plowshares."



Permissible Freight Charges On Warehouse Steel Shipments Clarified

Washington

••• The extent to which steel warehousemen and jobbers will be permitted to reflect the July 1 freight rate increase in their ceiling prices has been announced by OPA. Ceiling prices at these trade levels are figured under Revised Price Schedule No. 49. Increased ceiling prices, to the extent permitted, may be applied to all sales on and after July 26, 1946.

Generally, the prices established by RPS 49 are delivered prices determined by the use of a freight factor from governing basing point to destination. This freight factor may be increased by the amount of the new increase in freight rates. However, the increase in the actual freight rate from shipping point to destination must be absorbed by the reseller.

Specific application of the increases are:

1—Warehousemen and jobbers of merchant trade products, when computing their maximum prices by use of their own Apr. 16, 1941 selling prices, may use the higher freight factors from shipping point to destination. If such sellers compute their maximum prices by use of the formulas provided in the schedule, however, all freight factors may be computed on the basis of the new higher rates of freight. For direct mill shipments, resellers may compute their prices by the same method that their source of supply is permitted to use under the provisions of Revised Price Schedule No. 6.

2—Warehousemen and jobbers of pipe and tubular products may include the higher freight rates in figuring their maximum prices only if they are permitted to use the formulas provided in RPS 49. If the seller is required by the price schedule to use his own Apr. 16, 1941 selling prices, the higher freight rates will not change his maximum prices. For direct mill shipments of pipe and tubular products, the sellers under RPS 49 may use the higher freight rates in figuring their maximum delivered prices.

3—Warehousemen of tool steel may not adjust their maximum selling prices because of the increased freight rates. For direct mill ship-

ments of tool steels, the reseller may use the same freight factor permitted their source of supply under the provisions of RPS 6.

4—Warehousemen of all grades of alloy structural shapes, plates, strip and sheets, except stainless and low alloy high tensile or low alloy corrosion resistant steels, if they use their own April 16, 1941 selling prices, may not include the higher freight rates in figuring their maximum prices except in figuring the freight factor from shipping point to destination. If, however, the seller is permitted to use the formula provided in RPS 49 in figuring a maximum price, the freight factors in the formula may reflect the increased freight rates. Prices for direct mill shipments also may reflect the increased freight rates for these grades of steel.

5—Warehousemen reselling new cotton bale ties may not use the increased freight rates except in figuring a freight factor from shipping point to destination.

6—Warehousemen selling used cotton bale ties may reflect the increased freight rates in their maximum delivered prices by using the new rates from the applicable port to destination.

7—Warehousemen selling secondary or rejected grades of hot and cold-rolled sheets and strip, plates, tin mill black plate, semi-finished

products, and coated sheets other than tin plate and short ternes may use the new freight rates in every instance where freight is a factor in the formula provided under the price schedule for figuring a maximum price.

8—In figuring maximum delivered prices for all secondary or rejected new iron or steel products, other than those already mentioned, the higher freight rates may be used only in computing the freight factor from shipping point to destination. When the seller is computing the price of comparable prime material, however, he may use the increased freight rates. Maximum prices for secondary or rejected tinplate and short terne sheets are included in this grouping.

9—Warehousemen selling prime steels, such as carbon steel hot and cold rolled sheets and strip, carbon steel plates and structurals, and hot and cold-rolled bars may use the new freight rates in every instance where freight is a factor in the formula provided under the price schedule for figuring a maximum price.

10—Warehousemen selling all new iron or steel products other than those mentioned above, may use the higher freight rates only when determining freight charges from shipping point to destination or when determining freight charges from listed cities to destination in figuring lowest combination prices.

11—Holders of excess stock for which a maximum price is fixed under RPS 49 may use the higher freight rates in figuring maximum prices in any instance where freight is a factor in the formula provided under the price schedule for figuring a maximum.

12—Resellers of excess stock who do not put the material through the operations commonly known as the warehousing of iron or steel products may use the higher freight rates in figuring the freight factor from the basing point governing the destination to that destination.

13—Resellers of excess stock who put the material through the operations commonly known as the warehousing of iron or steel products may apply the higher freight rates to such stock only to the same extent that the higher freight rates are applicable to their regular warehouse stocks of iron or steel products.

Changes Its Mind

Washington

••• Plans to transfer the Foreign Div. of the Bureau of Census from Washington to New York, effective Oct. 1, have been abandoned. The Division will remain in Washington. It compiles exports and imports data and issues census statistics of importance to business. A subcommittee of the House Appropriations Committee had voted to slash funds for the division to \$950,000 and provided for its transfer to New York. Subsequently in the third deficiency bill the funds were increased to \$1,200,000 and provision made to retain the division in Washington. As a result it will be possible to continue issuance of four or five releases which would have been cut off under the smaller appropriation.

Kaiser Reported Ready to Bid On Republic's South Chicago Works

New York:

• • • Henry J. Kaiser will soon make a bid for the South Chicago steel plant, which Republic Steel Corp. built for the government and is now operating, according to informed sources here.

Backing Mr. Kaiser in this latest move toward a new and loosely integrated steel empire will be A. P. Gianini's Bank of America and not RFC, it is reported.

Following the first offering of South Chicago, bids were opened May 1 in the Office of Real Property Disposal of the War Assets Administration, Washington, and subsequently rejected.

Mr. Kaiser was known to be definitely interested in the plant at that time, having made a detailed survey of it, but he informed WAA that since it was built for heavy munitions and aircraft steel, it would not be suitable for his purpose of making steel housing and transportation products.

Republic Steel Corp., which built the \$90,000,000 plant, offered to lease it for 5 to 13 yr so that it could put in funds for reconverting the plant from its heavy wartime steel production to peacetime uses. Republic's minimum offer of \$200,000 rental was ac-

companied by detailed production scales of rental payments based on a wide variety of steel products.

Republic's bid stated that at least five electric furnaces would be removed, leaving four, and that the electric furnaces removed would be stored in case they should ever be needed again in a war emergency.

Central Steel Tube Co., Clinton, Iowa, offered the only other bid for South Chicago, proffering \$17,500,000 within the 2 yr necessary to convert the plant for peacetime use.

Built specifically for increasing production of high quality electric

furnace alloy steel, principally for aircraft, as well as rolled gun blooms for gun forgings, South Chicago's facilities include a by-product coke plant, sintering plant, one 1275-ton blast furnace, four 200-ton openhearth furnaces, nine 70-ton electric furnaces, of which at least six have been deferred, a 44-in. blooming mill, a 36 x 32-in. bar mill and service facilities.

The blast furnace has a capacity of 450,000 net tons of pig iron per year, and the openhearth furnaces have a capacity of 571,000 net tons of ingots per year. The openhearth and electric furnaces are designed for independent or duplexing operation and their capacities are dependent on the type of operation. South Chicago produces 480,000 net tons of heavy bars a year.

National Tube Co. To Consolidate Gary And Ellwood City Plants

Pittsburgh

• • • C. R. Cox, newly elected president of Carnegie-Illinois Steel Corp., said recently that the plans of the National Tube Co., of which he was president until Aug. 1, were to consolidate the operations of the tube company's Ellwood City, Pa., plant with those at the newer plant in Gary, Ind., and in 3 yr complete-

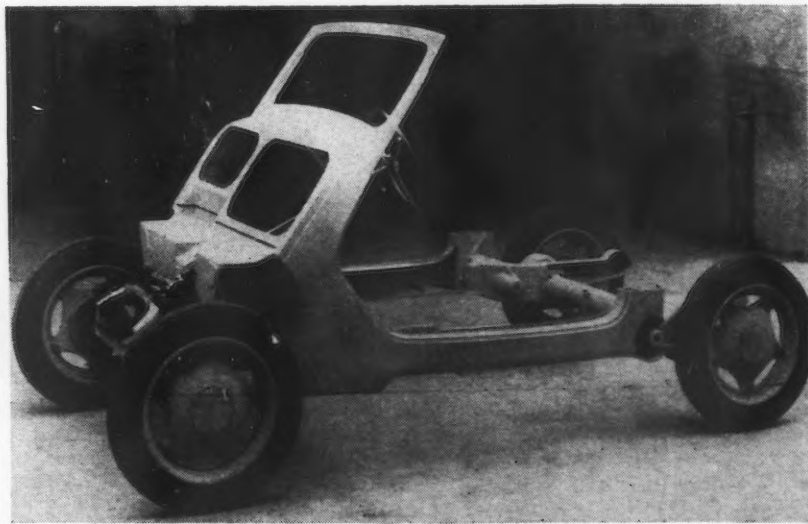
ly move out of Ellwood City to the new location.

He pointed out that tube producing operations could not be very well decentralized but that specialty tubing mills cannot be made part of the general tube producing plants. The economies of mass production at centralized locations plus the need for bessemer ores prevents decentralization of the general pipe plants. Specialty plants, however, cannot be too close to the general line plants because they would suffer for want of manpower, material, research, etc., that is diverted in times of stress to the heavy production items.

Mr. Cox pointed out that the McKeesport operation of National Tube Co. has been reduced to the minimum. The only finishing capacity now existing at that plant is two seamless pipe mills. A galvanizing shop and several merchant pipe mills have been moved to Lorain. With excess semifinishing capacity, National Tube plans to take over some of Carnegie-Illinois' semifinished load at the McKeesport plant.

To Lorain works, now undergoing a major expansion program that includes additional coke capacity and bessemer steel capacity, will be added a new type continuous seamless pipe mill. Mr. Cox pointed out that the mill is an entirely new approach and embraces new concepts in seamless pipe manufacture.

ONE PIECE CAR: So dubbed because its frame is a one-piece aluminum casting, this is the car for which Kaiser interests have reportedly obtained a producing license. It is believed Kaiser will use some of its design features, rather than manufacturing the car shown here.



• • • Dwight C. Warren, New England manager of THE IRON AGE, died suddenly Aug. 2, 1946, at the Hartford Hospital, Hartford, after a brief illness. He had been associated with THE IRON AGE, in this capacity since 1910, coming to this publication from *The Iron Trade Review* and *The Foundry*, in Cleveland.

Mr. Warren started selling advertising as a very young man, traveling through the British Isles, Belgium, France and the United States.

He was widely known for years in advertising circles and was very active in the Western New England Chapter of the National Industrial Advertisers Association of which he was a charter member and served two terms as a director. He is survived by his widow and a daughter, Mrs. John Sloane.



Formal Announcement of Priority Ratings Expected of CPA This Week

Washington:

• • • Formal announcement of the re-establishment of priority ratings for steel products, under PR 28, is expected to come from CPA this week. CPA will not extend Direction 12 to Order M-21 into the fourth quarter, and will use PR 28 as its primary device for easing steel shortages. This direction was established to take care of the third quarter steel needs of producers of certain farm machinery and housing items, and railroad brake shoes by means of a self certification program. The requirements of federal agencies are also included.

For all practical purposes, all ratings for steel products will be under PR 28 when the re-establishment is announced, except the CXS ratings for export steel, which will still be granted by the Office of International Trade, Dept. of Commerce. This move will strengthen CPA's hand in granting priorities aid for steel products and will enable the agency to hold down the issuance of ratings, except in emergency cases, following the stated policy of CPA Administrator John D. Small.

Rated orders for steel for specified critical housing materials will be issued under PR 28, but producers of farm machinery and railroad brake shoes will lose their favored position at the end of the third quarter. However, individual producers of these latter items

will be permitted to file applications for special assistance.

Direction 13 to Order M-21, embodying the self certification plan for pig iron for use in castings to be incorporated in specified farm machinery and housing items and railroad brake shoes, will be extended into the fourth quarter.

Housing items will draw the lion's share of ratings for steel issued under PR 28, for, in general, this regulation will still be used primarily as a device to break production bottlenecks.

The housing requirements to be met by the use of ratings are for fourth quarter delivery. However, because of the long lead time required by some products, such as galvanized sheet, the announcement is being made earlier so that

rated orders for these products may be placed with the mills by Aug. 15. Orders for products which require a shorter lead time will have to be placed by Sept. 1 to insure fourth quarter delivery.

Selected housing items for the fourth quarter will require an estimated maximum of 200,000 tons of steel, of which approximately 150,000 tons will be in steel sheet for various specifications.

The preliminary estimated steel requirements for housing, to be rated under PR 28, in net tons, broken down by end-products are as follows:

Bath Tubs	5,750
Convactor Radiation	3,500
Furnaces	
Floor and Wall	5,600
Warm Air	40,000
Furnace pipe, fittings and duct work	20,000
Lavatories	297
Registers and grills for heating systems	9,000
Sinks and tray combinations	4,770
Wiring devices	16,700
Builders Hardware	24,843
Low pressure boilers for residential use	4,500

British Exports Drop Because of Holidays

London

• • • Britain's export figures for June totaled \$260 million, showing a decrease of \$80.8 million compared with May. This decrease is because June had four less working days than May, including the V-day and Whitsun holidays, with the consequent dislocation to production and transport which must have extended longer than the holiday period. It is expected that the export figure for July will exceed the May total.

The value of Britain's exports

for the second quarter of 1946 amounted to \$878 million. This shows an increase of \$141.6 million or 19 pct on the value for the first quarter. Figures for the three leading groups are:

	First Quarter, 1946	Second Quarter, 1946
Machinery	\$81,600,000	\$104,400,000
Vehicles	66,400,000	104,000,000
Iron and steel and manufactures ..	70,800,000	88,800,000

June imports amounted to \$410 million, and the total value of retained imports for the second quarter of this year amounted to \$1232.8 million, which is \$168.8 million higher than the total for the first quarter.

Household Appliance Production Up Despite Acute Electric Motor Shortage

By D. I. BROWN
Chicago Regional
Editor

• • •



FUNCTIONAL STREAMLINING: Many streamlined kitchens have been designed by everyone from appliance manufacturers down to makers of door knobs. This kitchen incorporates design with utility. The sink and range are united in the one piece counter, leaving wall space clear.

Chicago

• • • Retail stores and merchandising houses are experiencing shortages in almost all items containing metals. Sales volumes, which are at an all-time high, are exceeded only by the continued heavy demand from both urban and rural districts. Household appliances are coming in a little faster. Cash transactions are the mode and electric motors continue to be the big bottleneck.

Public demand for goods continues heavy for almost any item sold in the nation's stores. Pent-up needs are particularly heavy in household appliances, agricultural equipment, plumbing supplies, and a host of other items, most of which consist primarily of metal. Catalogs published by the large mail order houses contain many items marked "Sorry—not available." Some companies are omitting the advertising sections covering the items that are particularly hard to get from their manufacturing sources.

One large merchandising house reported that during the first of the year they were returning \$1 million worth of mail orders per month because of inability to furnish. Mail order customers are being asked to first inquire at a retail store before sending in orders as the clerical force needed to just return orders could not possibly be tolerated.

Retail sales executives are

acutely aware that the current consumer demand does not represent the true market. Many retailers report that they often call many people supposedly in dire need of an item before a sale is made. The extent of padded demand cannot be determined. It is consensus that given two or three months of sustained production, a rational level will appear.

Inventories continue to be very low. It is not expected that household appliance inventories will be anywhere near sufficient before late next year. Shortest of shortages is appearing in mechanical refrigerators. Manufacturers of such equipment are still suffering from a component part shortage, with electric motors being the most acute. Although deliveries of castings and silicon sheets are tight, copper wire remains the most stringent. Refrigerator cabinets are relatively easy compared to motors and monthly deliveries of all items are slowly increasing. The industry believes that by fall this particular item will be eased to where decent promises can be made.

Household freezers, the only important new line in appliances, are very slow getting underway. Small plants dealing in specialties have jumped in hoping to clean up before the larger producers can fulfill the demand. Scores of companies have announced their entry into the freezer business but in

many cases it has merely been a protection measure.

The continued pressure for all types of farm implements and equipment, including fencing and wire products remains strong. The fabricators and makers of such items are in many cases operating at lower than 50 pct due to inability to secure raw material. One large producer of mechanical refrigerators has only been able to deliver 10 pct of the goods contracted for during the first 6 months of the year.

Supplies of flat rolled sheets for vitreous enameling are not as tight as many of the other items. Galvanized sheets are reported in some quarters as being almost impossible to obtain. Fence posts made by rerolling old, discarded heavy rails are unavailable in the quantities needed.

Galvanized pipe and copper tubing are still very scarce, although copper tubing has eased in the last few weeks. Flat rolled copper sheets, on the other hand, are more readily had. Of the 150,000 items carried by one house, 10,000 are regarded as difficult. The combined sustained production of all the makers of consumer goods will fast draw off the watered stocks, it is believed. Better inventories are expected along with a true consumer demand by early next year.

Brazilian Steel Mill Now in Production

New York

• • • Although the Brazilian National Steel Co. (Companhia Siderurgica Nacional) is reported to have recently advised industrialists in Sao Paulo that its rail structural mill is to be in production on rails and steel bars in November, the plant at Volta Redonda in the state of Rio de Janeiro has already begun the operations of its coke ovens, blast furnaces, openhearth and blooming mill. The battery of 55 coke ovens was producing in April; all

other facilities listed began their production in June.

For full details of the facilities and production capacity of the Volta Redonda steel plant see THE IRON AGE, July 5, 1945, p. 108.

It had been expected by company officials that the plant would be in production many months ago, but shortage of coal mine equipment ordered from producers in the United States delayed the production of sufficient coal to permit scheduled operations. Even now it is estimated that approximately 30 pct of the coal being consumed by the coke battery comes from the United States. However, when all equipment has been delivered, the company will be able to continue operations on its domestic coal production, which must be treated by washing and beneficiation.

The design of a steel foundry for maintenance purposes and for the production of ingot molds and cast rolls is approaching completion. Giffels & Vallett Co., Detroit, is handling the engineering and designing work. When completed, the foundry is expected to have the following annual capacity in net tons:

Alloy steel rolls	600
Steel castings	1500
Nonferrous castings	150
Ingot molds and stools	7000
Alloy iron rolls	320
Chilled iron rolls	130
Gray iron castings	1350
Alloy iron castings	150

Company executives were unable to predict how soon the foundry could be placed in operation.

GM Reports Profits Exceed \$16 Million

Detroit

• • • While reporting a net profit during the second quarter totaling \$16,320,573, the General Motors Corp. reported that operations for the period resulted in a loss of \$12,145,427 before certain federal income and excess profits tax adjustments. During the first six months, after tax adjustments of \$81,330,000, the company reported a net loss of \$19,804,090.

Sales during the first half of 1946 were only \$492,260,800, reflecting the shutdown of most GM plants in the first quarter because of the UAW-CIO strike. In the first 6 months of 1945, sales totaled \$2,

014,924,823, including war material sales of \$1,749,981.

Net income for the second quarter, 1945, was \$60,727,654, while the half year's net in 1945 was \$110,957,383, after adjustments.

The company reported that at the end of June the flow of materials and supplies was curtailed by strikes in the plants of 83 suppliers. Meanwhile, automobile dealer backlogs are large and of long

standing. At the end of the second quarter, automobile production schedules were only 40 to 45 pct of what had been expected. The total sales during the quarter to dealers, including overseas shipments from the United States and Canadian plants but excluding production by overseas manufacturing units, amounted to 254,382 cars and trucks. Domestic sales to dealers totaled 214,146 cars and trucks.

MONTHLY EXPORTS OF MACHINE TOOLS

as reported to
National Machine Tool Builders' Assn.

SHIPMENTS

	Total Shipments (as reported)	Foreign Shipments (as reported)	Foreign Percent of Total Shipments
1945			
September.....	\$25,391,235	\$6,081,820	24.0
October.....	29,026,846	5,618,105	19.4
November.....	24,258,463	4,216,810	17.5
December.....	21,646,815	4,402,499	20.3
1946			
January.....	26,144,211	7,712,703	27.4
February.....	25,062,581	6,256,333	25.0
March.....	25,412,583	6,193,015	24.4
April.....	26,141,062	6,584,362	25.2
May.....	24,725,197	6,797,698	27.4
June.....	28,490,000	6,300,000	24.0

NEW ORDERS

	Total Orders (as reported)	Foreign Orders (as reported)	Foreign Percent of Total New Orders
1945			
September.....	\$22,698,168	\$2,967,740	13.1
October.....	26,351,927	4,862,783	18.4
November.....	23,728,539	4,854,267	20.5
December.....	31,610,252	13,397,856	42.4
1946			
January.....	30,579,939	11,713,487	38.3
February.....	21,672,232	6,520,504	30.1
March.....	28,302,349	7,121,275	25.2
April.....	32,646,613	6,696,505	20.5
May.....	28,497,922	6,342,374	22.3
June.....	25,580,000	9,300,000	32.0

CANCELLATIONS

	Total Cancellations (as reported)	Foreign Cancellations (as reported)	Foreign Percent of Total Cancellations
1945			
September.....	\$8,978,514	\$1,254,398	14.1
October.....	9,020,565	1,866,175	20.7
November.....	2,476,427	391,939	15.8
December.....	1,748,315	271,500	15.5
1946			
January.....	2,897,604	455,982	15.7
February.....	1,881,282	457,219	24.3
March.....	2,002,937	694,146	34.2
April.....	1,467,442	464,253	31.6
May.....	3,231,856	583,065	18.0
June.....	1,632,000	370,000	22.9

UNFILLED ORDERS

	Total Unfilled Orders (as reported)	Foreign Unfilled Orders (as reported)	Foreign Percent of Total Unfilled Orders
1945			
September.....	\$185,519,099	\$37,668,302	20.3
October.....	173,806,696	33,192,304	19.1
November.....	170,702,143	33,818,102	19.8
December.....	178,972,145	42,711,002	23.9
1946			
January.....	178,140,663	49,625,663	27.9
February.....	174,143,173	50,435,681	29.0
March.....	175,359,691	51,317,501	29.3
April.....	180,605,915	51,158,574	28.3
May.....	182,888,583	50,634,336	27.7
June.....	183,400,000	54,400,000	29.0

Bunker Oil Shortage May Require Changes In Eastern Mills' Fuel

Philadelphia

• • • Eastern Pennsylvania steel mills that fire furnaces with bunker "C" fuel oil have been concerned with the prospect for continuing supplies of the fuel, as it is known that at least two mills have been warned of the possibility of the early termination of deliveries by a principal petroleum refiner.

The refiner points out that this grade of industrial fuel, which corresponds to furnace oil No. 6, is a byproduct of the cracking process for the production of gasoline and other higher priced petroleum derivatives. It is estimated by the refiner that a minimum price increase of 80¢ per barrel, in addition to the recent 20¢ increase, would be required before it would be profitable for them to set up for the production of bunker fuel oil as a primary product.

Another principal factor in the shortage of the byproduct fuel oil is the way industry on the Eastern Seaboard is gradually turning to the use of bunker "C" oil as the most economical in view of the repeated price increases for coal during and after the war. With the exception of a slight adjustment in price based on gravity ratings, the increase of 20¢ which brings the price up to \$1.92 per 42-gal barrel is the first price increase for bunker fuel since the beginning of the war.

It is expected that the increase may result in the diversion of some consumption from oil to coal. If this does not happen it is certain that further price increases may be expected in order to bring supply and demand into balance. The fuel was decontrolled recently by OPA. Some refiners originally scheduled the current price increase at 30¢ per barrel.

One producer of low-sulfur fuel oil, the Sun Oil Co., has found it necessary to notify some of its customers of its inability to continue to supply them with fuel, particularly where facilities exist for the economical use of alternative fuels. Many industrial plants are said to have equipment available for the relatively low cost handling or use of other fuels

but continue to use bunker fuel oil as an economy measure. Sun Oil is endeavoring to make its available output go as far as possible by urging the management of such plants to turn to the use of other types of fuel.

This is purely an Eastern Seaboard situation so far as the steel industry is concerned, as most other steel plants use other fuels which in their locality are more

CIO Makes "Final Offer" In Canada's Steel Strike, Asks 15½¢ Increase

Ottawa

• • • C. H. Millard, National Director of United Steel Workers of America, CIO, made "a final offer" for the settlement of the wage dispute in the Canadian steel industry to the House of Commons Industrial Relations Committee on Aug. 1. He asked a general wage increase of 15½¢ an hr across the board, payable as follows: 10¢ per hr, retroactive to Apr. 1, 1946, 2½¢ per hr additional, effective Oct. 1, 3¢ per hr more, effective Dec. 1. A monthly adjustment commencing in January, 1947, of 1¢ per hr, for each point by which the cost of living index rises after July 1, 1946. Mr. Millard continued: "This strike cannot be settled unless we get an iron-clad guarantee of 15½¢ an hr increase, effective Dec. 1, 1946." He said his union had offered to delay part of the increase to next October and December because it will take the industry some time to get into full operation.

If there is a 5-point rise in the cost of living index between July 1 and the end of the year, the steel workers would be entitled to a further 5¢ an hr increase, or a total increase of 20½¢ an hr. Hitherto the union has been demanding a settlement at 19½¢ an hr, but the companies have said that they will not give a larger increase than 10¢. Mr. Millard also demanded the application of the "Rand Formula" in steel which provides for the check-off.

The plan offered by Mr. Millard proposes hitching the wages in the steel industry to the cost of living. "We say that if the cost of living has gone up next year there must

be a corresponding increase in the wages of the men," Mr. Millard said. He added that if there was a decrease in the cost of living index, there should not be a corresponding decrease in steel workers' wages. The increase which would be held would be counted as contributing to raising the living standards of the workers.

Dominion Steel Strike Hits Fabricator Plants

Toronto

• • • Shutting off deliveries of steel and pig iron through the closing of the three big Canadian basic steel producers, is having disastrous effects on industrial operations in this country. Already a number of plants have been forced to reduce operating schedules and have let out several thousands of workers, and it is estimated that within another week or 10 days most plants that depend on iron and steel as their chief raw material may have to close down entirely, unless fresh supplies are forthcoming without delay.

Production by the Steel Co. of Canada at Hamilton is being continued at approximately 70 pct of normal, but shipments of finished materials are not being made as it is impossible to get materials past the union picket lines.

Insofar as Algoma Steel Corp. and Dominion Steel & Coal Co. are concerned, it will be 2 or 3 weeks after the strike has been settled and workers return to their job before full production schedules again can be attained. Under these conditions it may be assumed that at least a half of the normal production for third quarter will be lost, even if the strike is settled without further delay.

Weekly Gallup Polls . . .

Democrats Lose Support of Independent Voters

Princeton, N. J.

• • • The Democratic Party has lost ground sharply since 1944 with the group of voters that controls the balance of power in national elections—the independent voter, according to George Gallup, director, American Institute of Public Opinion.

The proportion among these voters preferring the Democratic Party has dropped from 62 pct at the time of the 1944 elections to 51 pct at present—a drop of 11 points.

So far as these results go, an independent voter is a man who calls himself an independent when asked:

"In politics, as of today, do you consider yourself a Republican, a Democrat, a Socialist, or an Independent?"

Forty pct call themselves Republican, 39 pct call themselves Democratic, and something less than 1 pct call themselves Socialist.

This leaves 21 pct who say they are independent voters. The group thus adds up to a powerful voting body which is the deciding factor in national elections. It totals about one voter in every five or roughly 10,000,000 among those who cast a ballot in the last presidential election.

In measuring sentiment among the independent voters, the institute had field reporters in all parts of the United States ask a cross-section of voters a question which is used periodically to gage party strength, aside from candidates:

"If a presidential election were being held today, which party would you vote for, the Democratic or the Republican?"

The results:

	Pct
Democratic	51
Republican	49

The trend of independent voter sentiment is shown here for 1940 and 1944, as compared with the present trend.

	Democratic Pct	Republican Pct
1940	61	39
1944	62	38
TODAY	51	49

There is, of course, no telling at this stage in the game whether the

course of events will swing the independent vote back into the Democratic columns. But, unless the current trend is halted or reversed, it is a bad omen for the Democratic Party in the Congressional elections this fall.

This is not to say that present findings can be regarded as a forecast on the outcome of the election in terms of seats. Such a forecast would call for a survey in each of the 435 Congressional districts in which there is a contest.

There is, nonetheless, a roughly proportional relation between changes in party strength and changes in the distribution of seats in the House.

There has also been a sharp trend of sentiment away from the Democratic party among white collar workers and members of labor unions.

Although other major occupational groups, such as farmers and professional and business people show a shift away from the Democrats since 1944 as well, the defection has not been as great as among white collar and union groups.

As a result of these shifts, the Republican and Democratic parties are today almost evenly matched, with the GOP holding a slight edge. As reported earlier, 51 pct of the country's voters polled by the institute say they would vote Republican if a presidential election were being held today, while 49 pct say they would vote Democratic.

With the country so evenly divided, there is every prospect for a long and bitter political fight between the major parties leading up to the 1948 presidential election, with the Republicans today closer to victory than at any time since before Roosevelt was elected in 1932.

The following shows the proportion of voters in major occupation groups and among union members who say they would vote Democratic today. The vote in the 1944 election is also given for comparison.

Democratic Party Loses Votes Among Three Major Supporting Groups of Previous Elections

Democratic Percentage of Major Party Total Vote

	Today Pct	1944 Election Pct	Point Change Since 1944
Prof. & Bus.	39	41	-2
White collar	45	51	-6
Manual workers	58	62	-4
Farmers	44	48	-4
Union members	62	72	-10

The figures are not to be construed as a forecast for 1948. They obviously cannot take into account the popularity of candidates selected to run. Moreover, events of the next 2 yr may radically alter present day sentiment.

The Democrats have truly fallen into hard times, politically, as compared to the rosy days of 1936 or even 1940. The party had a huge majority among white collar workers, manual workers, farmers and union members in 1936, and polled nearly half the votes of the professional and business people to boot. In 1940 there was a marked defection among white collar workers, but the party continued to have big majorities among the numerically large manual worker and farm group, to say nothing of the union members.

The long-range trend follows:

	Democratic Vote, Pct			
	Today	1944	1940	1936
Prof. & Bus.	39	41	36	48
White collar	45	51	48	61
Manual workers	58	62	66	74
Farmers	44	48	54	59
Union members	62	72	72	80
National vote	49	54	55	62½

The defection among union members is presumably due to union criticism of Mr. Truman's handling of the railroad strike and a general union feeling that Mr. Truman is not as pro-labor as he might be.

Even so, union members show more support of the Democratic party than nonunion workers in

(CONTINUED ON PAGE 148)

Earnings Statements Reflect Strike Costs

Reserve Funds And Tax Credits Tend To Offset Some Losses

• • • Republic Steel Corp., Cleveland, reported a consolidated net income for the second quarter of 1946 of \$4,802,756 after all charges, including federal income taxes.

The second quarter earnings compare with \$3,271,703 for the corresponding quarter in 1945. A provision for federal income taxes of \$3,315,000 was made for the current quarter.

Earnings for the first half total \$4,455,343. The first half in 1945 was \$6,356,251.

• • • Alan Wood Steel Co., Conshohocken, Pa., furnishes data indicating a net loss of \$133,375 for the first 6 months of 1946, as contrasted with net income of \$66,065 in the corresponding 1945 period. Net sales were \$10,228,225 in that period as against \$13,502,498 in the first 6 months of 1945.

• • • Youngstown Sheet & Tube Co., Youngstown, showed a profit of \$3,099,099 for the second quarter ended June 30. Net sales and other revenues amounted to \$51,478,636. Income before taxes was \$5,048,099. In the second quarter of 1945 profit was \$2,119,398 after adjustment for accelerated amortization of emergency facilities. Taxes were \$4,495,155 in that quarter.

• • • Jones & Laughlin Steel Corp. reported for the quarter ended June 30, 1946, a consolidated net income of \$2,343,298. This compares with a net income of \$2,357,284 for the same quarter, 1945. Consolidated net income for the 6 months ended June 30, 1946, was \$3,156,544, compared with a net income of \$4,371,013 for the same period of 1945. Sales for the 6-month period of 1946 were \$106,101,492, against sales of \$166,453,926 during the January-June period of 1945.

Because of the expenses incurred as a result of the steel strike the company transferred \$4,000,000 from reserves for contingencies. As the strike cost is deductible for income tax purposes, no provision for income taxes would have been required on the basis of results for

the first six months of 1946 except for certain subsidiary companies. However, on the assumption that on an annual basis the company will realize taxable income, provision for taxes amounting to \$1,136,000 were made.

• • • The American Rolling Mill Co., Middletown, Ohio, earned \$5,218,129 during the second quarter of 1946, after all charges and provision for income taxes. For the same quarter of 1945, Armco earned \$2,071,925.

Armco's consolidated earnings for the first six months of 1946, ended June 30, are \$7,022,616 compared with \$3,947,428 during the first six months of last year.

• • • M. A. Hanna Co. reports consolidated net profit of \$2,231,393 for 6 months ended June 30, 1946, after all charges including depreciation and depletion and provisions for federal taxes.

Profit is equal, after preferred dividends, to \$1.97 a share on the 1,030,464 common shares outstanding. In the corresponding period of 1945 net profit amounted to \$1,999,053, or \$1.76 a share on the 1,016,961 shares then outstanding.

Net profit for 3 months ended

ALLOY RODS GET HEP: *This miniature three octave piano utilizes alloy steel rods, which replace the usual piano strings. It was designed for convalescents in Army hospitals, but will be manufactured commercially by a Los Angeles firm. The plastic case acts as a sounding board.*



June 30, 1946, was \$1,210,922, equal to \$1.08 a common share, compared with \$1,152,056 or \$1.03 a share, for the second quarter of 1945.

• • • Keystone Steel & Wire Co. reports for the fiscal year ended June 30, 1946, preliminary net profit subject to completion of audit, of \$2,109,951, equivalent to \$2.78 per share on 757,637 shares of capital stock outstanding. Net profit for the previous fiscal year was \$1,588,209, equivalent to \$2.10 a share of capital stock.

• • • Continental Steel Corp. states that net profit for the second quarter, after provision for all known contingencies and taxes, totaled \$380,152.96, equivalent to 76¢ a share on the \$14 par common stock outstanding. Net profit of \$10,961.50 was shown for the first quarter of 1946.

Net sales for the quarter just ended were \$6,422,693.31, compared with \$4,342,684.41 in the preceding quarter and \$4,876.16 for the equivalent quarter of 1945. Sales for the first half of 1946 totaled \$10,765,377.72 as compared with \$12,188,631.55 for the first half of 1945.

• • • The Midvale Co., Philadelphia, reports a net profit of \$1,214,409 for the 12 months ended June 30, 1946 made up of a loss from operations in the amount of \$1,726,591 and credits of (a) \$1,793,000 for reduction of liability for 1945 income tax and renegotiation refund as a result of loss for the 6 months ended Dec. 31, 1945; and (b) \$1,148,000 for estimated recovery under carry-back provisions of the Revenue Act with respect to loss for the six months ended June 30, 1946 (subject to adjustment).

The net profit for the 12-month period ended June 30, 1946 was equivalent to \$2.02 per share on the company's outstanding capital stock.

• • • National Steel Corp. reported net income, after all charges, for the quarter ended June 30, 1946, of \$5,602,988. This compares with earnings in the second quarter of 1945 of \$3,453,183, and with earnings in the first quarter of 1946 of \$2,083,356.

Earnings for the six months ended June 30, 1946 are \$7,686,344, compared with earnings in the first

six months of 1945 of \$6,883,171. All expenses resulting from the coal strike have been charged against cost of operations in the second quarter of 1946.

• • • **Inland Steel Co.** showed a net income from operations for the first 6 months of 1946 of \$4,973,300. Operations during this period, however, have been seriously affected by a variety of causes. All expenses incident to strikes, amounting to approximately \$2,650,000 for the period, have been charged against current operations.

• • • **Copperweld Steel Co.**, net income for the 6 months' period ended June 30, was reported at \$50,540 after crediting to income \$110,531, representing one-half of reserves charged against operations in prior years after provision of \$43,237 for federal and state income taxes.

The first 6 months of 1945 showed a net income of \$475,959 after provision of \$307,747 for taxes.

• • • **Continental Can Co.**, New York and subsidiaries, for the 12 months ended June 30, 1946, reported consolidated profits before depreciation, depletion and income taxes of \$9,642,511, compared with \$23,436,400 earned before depreciation, taxes and appropriation for inventory price decline or other contingencies, in the 12 months ended June 30, 1945, Carle C. Conway, chairman of the board and president announced.

After deducting \$5,629,203 for depreciation and depletion, and \$436,545 to cover the estimated amount required to be added to the reserve for income taxes, net earnings were \$3,576,763.

• • • **Monarch Machine Tool Co.**, Sidney, Ohio, reports that for the second quarter of 1946, after taxes and other charges and subject to year-end adjustments, totaled \$159,354 or 76¢ per share on the 210,000 shares outstanding, it was announced recently by Wendell E. Whipp, president. Net earnings for the second quarter of 1945 were \$150,804, or 72¢ per share.

Net earnings for the first half of 1946, after taxes and other charges and subject to year-end adjustments, totaled \$283,751, equivalent to \$1.35 a share, on net sales of \$3,307,298, as compared to net earnings of \$317,497, or \$1.51 per share, on net sales of \$8,017,598, for the first half of 1945.

Appoints Mediator to Assist In Settling Granite City Steel Strike

Granite City, Ill.

• • • **Father Leo G. Brown**, assistant professor of economics, St. Louis University, on July 29, was appointed Secretary of Labor Schwellenbach's special representative to attempt settlement of the Granite City Steel Co.'s strike which began Mar. 15. The strike was called by the International Assn. of Machinists which involved 175 members of that union. The CIO union workers, numbering 1700, refused to cross the machinists' picket line so that operations of the entire plant came to a standstill.

Premium pay for Saturday and Sunday working hours plus a general increase of 30¢ an hr were demanded by the striking machinists. Negotiations between the labor union and the company were broken off on Apr. 18. The company at that time had offered a 20¢ an hr increase but had rejected in its entirety the premium pay for Saturday and Sunday work. On June 1 the steel company notified its 300 office employees of their termination, however, their pay continued through and including June 30.

Only about 25 pct of the idle workers have been able to find other employment and earnings have fallen off with subsequent loss being felt by all types of business in the area. Conditions became so bad that on June 19 a local citizens' committee led by the mayor prevailed upon the union and company to reopen negotiations. This effort was successful in arranging for a meeting that was held June 29 between the union, the company and government mediators. The only issue unsettled prior to Secretary Schwellenbach's appointment was the time and a half pay for Sunday work. The union has agreed to accept a 20¢ an hr increase and has waived its demand for premium pay for Saturday work.

Fabricators depending on the production of this plant have found themselves handicapped, particularly the concerns needing electrical sheets, galvanized and light-gage sheets, tinplate and

cold-reduced flat rolled products. The annual rate of capacity, in ingot tons, of the plant is 403,200 net tons not counting the three openhearth furnaces belonging to DPC. G. H. Niedringhaus, president, stated that negotiations are in progress to secure DPC melting facilities which would make a total annual capacity of 703,200 net ingot tons.

Granite City Steel has on order from Mesta, in Pittsburgh a complete cold-reducing mill which has been built and stored as it cannot be installed until the strike is over. Mr. Niedringhaus also denied that the plant was for sale or that the management had been approached by any domestic or foreign concerns.

The meeting between the union representatives and Father Leo G. Brown, also a member of the Wage Stabilization Board, is expected to take place in the very near future and will evolve around the only issue unsettled, as yet, which is time and a half pay for Sunday work.

Donald M. Nelson Will Study Standby Plants

Washington

• • • **Determination of Government-owned plants** that will be kept in standby position ready for quick mobilization and of those that will be sold or leased to private industry will be based on a survey to be made by Donald M. Nelson, former WPB chairman. Upon the recommendation of Reconversion Director John R. Steelman, the President on July 27 appointed Mr. Nelson to make a special study of the proposed \$3½ billion plan to retain war built facilities. Legislation will not be asked by the President until Mr. Nelson has completed the survey and made recommendations.

Under the legislation as now proposed, Government-owned plants and equipment would be transferred from RFC to the War and Navy Depts. without compensation, and be leased to private interests.

Price Quotations of High Tensile Low Alloy Steels Will Appear Each Week

Pittsburgh

••• The increased use of high tensile, low alloy steels has brought steel products of these types into prominence during the past few years. Many fabricators of household appliances, toys, railroad equipment, trolley cars, electrical equipment, automotive parts, and a great variety of products have found that these steels answer very well their need for products of better physical characteristics than can be found in straight carbon steels, but not necessarily the characteristics available in high alloy products.

High tensile, low alloy steels are made by a variety of steel producers under each producer's specific trade name. For example, there are: Corten, Mayari R, Aldecor, Double Strength, Otiscology, Yoley, A. W. Dynalloy, Nax, Y-50 and

other such steels, all low alloy products.

The steels, generally, are based on carbon steel prices, but some carry extras that are applicable to alloy steels. Other producers use straight carbon steel extras.

As an added service to its readers, THE IRON AGE has examined the price setup of these low alloy, high tensile steels and will carry these prices as a weekly feature henceforth. Along with the price are the names of the manufacturers that make each specific alloy listed.

The prices shown are the base prices at the major basing points applying to each company. Arbitrary delivered prices on these commodities for such areas as Detroit, Eastern Michigan points, Toledo, Gulf Ports and Pacific Coast Ports, can be obtained from the manufac-

turer of the specific steel and product desired. The prices for these product listings are shown in the accompanying table, but henceforth will be included in the steel prices data that appear in another section of THE IRON AGE each week.

Surplus Bale Tie Wire Must Go to Tie Makers

Washington

••• CPA has extended for another 60 days the period during which WAA is required to continue to channel government surplus bale tie wire to producers of bale ties.

WAA previously had been required to set aside out of government surplus 7500 tons of carbon steel, black annealed, for galvanized wire for use in making wire bale ties. This period, which expired July 31, has now been extended to Sept. 30 because as yet this amount has not been set aside.

HIGH TENSILE, LOW ALLOY STEELS CENTS PER POUND

The following prices are the base prices that apply for each product at basing points on which producers will sell. Arbitrary delivered prices can be obtained from the producer

	Hi Steel (Inland)	Corten (Carnegie- Illinois and Republic)	Mayari R (Bethle- hem)	Aldecor (Republic)	Double Strength No. 1 (Republic)	Otiscology (Jones & Laughlin)	Yoley (Youngs- town Sheet & Tube)	A. W. Dynalloy (Alan Wood)	Y-50 (ARMCO)
Standard Shapes.....	3.45	3.45	3.45	....	....	3.45	3.45	....	....
Wide Flange Beams.....	....	3.45	3.45	....	....	....	....	....	....
Plates.....	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	....
Bars.....	....	3.70	3.70†	3.70	3.70	3.70	....	....	....
Bar Shapes.....	3.85	3.85	3.85	....	....	3.85	3.85	....	....
Hot Rolled Sheets.....	3.575	3.575	3.575	3.575	3.575	3.575	3.575	3.575	....
Cold Rolled Sheets.....	4.525	4.525	4.525	4.525	4.525	4.525	4.525	....	4.625* 5.225†
Hot Rolled Strip:									
Over 6-in.....	3.60	3.60	3.60	3.60	3.60	3.60	3.60	....	....
6-in. and under.....	3.70	3.70	3.70	3.70	3.70	3.70	3.70	....	....
Cold Rolled Strip.....	4.40	....	....	4.30	4.30	4.30	4.30	....	4.55* 5.00*
Galvanized Sheets.....	....	....	5.50	....	....	....	....	....	....
Commodity C. R. Strip.....	....	....	....	....	....	4.45	....	....	....
Hot Rolled Bars:									
Structural Grade.....	....	....	....	....	....	....	3.733†	....	....
Forging, Heat T. Grade.....	....	....	....	....	....	....	4.112†	....	....
Cold Rolled Bars:									
Structural Grade.....	....	....	....	....	....	....	4.382†	....	....
Forging Grade.....	....	....	....	....	....	....	4.761†	....	....
Billets, Blooms, Slabs (\$ per Gross Ton)									
Structural Grades.....	....	....	....	....	....	....	\$74.66†	....	....
Forging Grade.....	....	....	....	....	....	....	\$82.23†	....	....
Bars, Flats, Rounds, and Squares.....	3.83†	....	....	....	....	....	....	....	....

* 20 gage and heavier.

† 21 gage and lighter.

† Alloy extras applied.

Bureau of Mines Undertakes \$1.5 Million Shale Oil Demonstration

• • •

•••The U. S. Bureau of Mines estimates that the western mountains hold some 100 billion barrels of shale oil, five times as much as the petroleum industry has produced since drilling started in 1859. Pictured on this page is a \$1.5 million demonstration project which the Bureau has under way at Rifle, Colo.

The mountains of Kentucky, Utah and Wyoming, as well as areas in Nevada, Indiana, Ohio, Texas and Kentucky are reported to contain shale oil. Although shale oil is inferior to and more costly than petroleum, the Bureau will pass on to private industry the results of the survey; it is felt that some day the oil may be valuable in case of a national emergency, as it was in Germany and Japan.

In the first of the pictures at the right a crew is drilling shale in the mine high above Rifle to test its oil bearing quality.

In the central view, workers are bringing oil shale out of the mine on cars, whence it will be transferred by aerial tramway to the refinery at Rifle.

The 250 workers engaged on the project are housed in the dwellings shown in the third illustration. The site is 2000 ft below the escarpment on which the shale is mined.

One of the toughest problems facing the development crew is how to get rid of the vast quantities of spent shale generated in the oil recovery operation.

• • •



Detroit Audience Views Kaiser-Frazer Autos

Detroit

••• Just one year to the day after the organization of the Kaiser-Frazer Corp. and eight months after work was started at Willow Run, the new Frazer and the new Kaiser Special made their debut before a critical Detroit audience. Judged both by public enthusiasm and the comments of seasoned automobile men who examined the cars with painstaking scrutiny the new models won generous approval and the company was given high praise for a production achievement which many had said "couldn't be done."

The fact that production at K-F has now been boosted to 20 per day and may exceed 100 per day before Willow Run is a year old automobile plant can hardly be ignored by even the most skeptical builder of automobiles.

While it will yet be some time before the 4300 K-F dealers and distributors are supplied with

sample cars, the new models should begin to move to the public in quantity late this yr. From this point on, the rate of delivery will be largely a matter of obtaining necessary skilled labor and materials, both of which are scarce at the moment. The Willow Run plant has been handicapped from the start by a shortage of skilled labor and this shortage may, in the final analysis, turn out to be the biggest operating problem.

By the usual standards of public judgment: Styling, general appearance, roominess, safety features and engineering design, Detroit gave its approval to both K-F cars which, incidentally, have almost identical power plant and body and differ only as to bumper and grille details and certain interior appointments.

J. W. Frazer has announced that "he hopes to sell the Frazer at \$1650 and the Kaiser Special for \$150 to \$200 less."

The power plant for both cars is a six-cylinder 100 hp Continental engine developed by Continental and Graham-Paige.

ODT Asks CPA Directive For Freight Car Steel

Washington

••• ODT has announced that it has requested CPA aid in getting steel for railroad cars now on order as it pushes its proposed 50,000 railroad freight car building program (THE IRON AGE, July 25, p. 108) to be financed by RFC. It is estimated that the program would call for the use of 900,000 to 1,000,000 tons of steel.

The suggestion that the cars be built by the government and then either sold or leased to the carriers was prompted, according to ODT, by the pressing need of this additional number of cars to supplement the 18,256 built during the first half of 1946 plus 39,437 on order. If effectuated, this program would fulfill ODT's recommendation early this year for a 1946 construction program of 80,000 cars.

Officials of ODT, RFC and the Assn. of American Railroads conferred recently on the contemplated government proposal. AAR president J. J. Pelley announced that several railroads are interested in the program while others are proceeding with the purchase of needed cars under plans which involve private financing.

Through the program suggested by ODT or otherwise, he declared, the railroads will increase their supply of cars. At any rate of building possible under the present production difficulties, he said, there will not be enough new cars in the near future to bring freight car supply up to demand.

Agrees to End Strike

Chicago

••• The Inland Steel Container Corp. announced recently that production workers at its Menard Ave., Clearing, Ill., plant (Local 1422, USWA-CIO) in a vote had approved a contract to end a strike begun last Jan. 21.

According to John Gossett, vice-president of the container firm, the contract includes an 18½¢ an hr increase without retroactive provisions and with union security provisions. Six hundred production workers are affected.

Coming Events

- Sept. 10-14 American Chemical Society, exposition, Chicago.
- Sept. 11-12 Society of Automotive Engineers, national tractor meeting, Milwaukee.
- Sept. 16-20 Instrument Society of America, first conference and exhibit, Pittsburgh.
- Oct. 1-4 Assn. of Iron & Steel Engineers, Iron & Steel Exposition, Cleveland Public Auditorium, Cleveland.
- Oct. 3-5 National Electronic Conference, Chicago.
- Oct. 3-5 Society of Automotive Engineers, aeronautic meeting and display, Los Angeles.
- Oct. 9-11 Porcelain Enamel Institute, University of Illinois.
- Oct. 10-12 American Society of Tool Engineers, semi-annual convention, Pittsburgh.
- Oct. 16-19 Electrochemical Society, fall congress, Toronto.
- Oct. 28 American Institute of Steel Construction, annual convention, Coronado, Calif.
- Oct. 28-30 American Gear Manufacturers Assn., semi-annual meeting, Chicago.
- Oct. 29-Nov. 1 Refrigerator Equipment Manufacturers Assn., exposition, Cleveland.
- Nov. 7-8 National Founders Assn., New York.
- Nov. 17-22 American Welding Society, annual meeting, Atlantic City, N. J.
- Nov. 18-22 National Metal Congress and Exposition, Atlantic City, N. J.
- Dec. 2-4 Society of Automotive Engineers, air transport meeting, Chicago.
- Dec. 2-7 National Power Show, New York.

The London **ECONOMIST**

Neo-Isolation

IS isolationism coming back to life again in the United States?

No, say the internationalists, pointing to the Congressional approval of the British loan and to the results of Republican primary elections in Minnesota and North Dakota. Yes, say the isolationists, pointing to the 2 to 1 vote against the British loan by Republican Congressmen and to the results of Republican primary elections in Nebraska and North Dakota. Besides, they say, there is no such thing as an isolationist anyway; we are nationalists.

For 4 yr from the attack on Pearl Harbor to the end of 1945, isolationism was at nadir. People and Congress supported the war with near-unanimity. After VE-Day, the Senate approved the United Nations Charter with far more than the required two thirds vote; and Congress readily renewed the Reciprocal Trade Agreements Act, enlarged greatly the capital of the Export-Import Bank, and approved the Bretton Woods Agreements. These events obscured the fact that the great debate on foreign policy which the bombs at Pearl Harbor cut short had never been really settled.

The Congress of 1946 is still largely the same in membership as the one which came within one vote of letting the new army die in 'he summer of 1940; and in 1946 its voting behavior is returning to 1940 modes. The long agony of the debate over peacetime conscription is still without issue; it took from January to July and a great deal of pressure from the Administration to get the British loan through. Congress still treats the American economy as a private preserve, in which inflation, unemployment, and interruptions of production are no concern of the rest of the world, however, deeply they may affect it.

In the American press and radio there has been endless discussion of the Republican senatorial primaries of Nebraska, North Dakota, and Minnesota, chiefly in terms of their effect on Harold Stassen's prospects for the Republican presi-

dential nomination in 1948, and in terms of the strength of isolationism in the Republican Midwest. Radio networks, press, telegraphic news services and syndicated columnists operate on a national scale, so they have confined their discussion primarily to the fate of nationally-known men like Stassen (whose candidate for senator won in Minnesota and lost in Nebraska); Senator Shipstead, the arch-isolationist who was defeated by Stassen's man Governor Thye of Minnesota; isolationist Senator Hugh Butler, who defeated Stassen's man, Governor Griswold of Nebraska; arch-isolationist ex-Senator Gerald Nye, who was defeated for one senatorial nomination in North Dakota; and arch-isolationist Senator Langer, who was renominated for the other senatorial post now vacant in the same State.

Two isolationists out, two isolationists in; that provides scope for argument. Only the trouble is, Isolationist Nye was defeated by the almost equally isolationist Milton Young; Internationalist Thye soft-pedaled the touchy issue of the British loan in the later days of his campaign, and both he and Stassen supported for renomination the incumbent Republican congressmen from Minnesota, who include one internationalist and six isolationists.

IN all three states, voting ran light as usual in primary elections, and control of the state political machine for getting out the vote had much more to do with the result than issues of isolationism versus internationalism. An ingenious Nebraska editor argued that the 2 to 1 vote against Internationalist Griswold there did not prove anything; add Griswold's 40,000 votes to the 46,000 votes divided between two internationalist candidates in the Democratic senatorial primary; add at least half of Senator Butler's 80,000 votes, which were his for local rather than international reasons, and you have at least 3 to 1 international votes! But the fact remains that two out of

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• • •

three Nebraska Republicans who went to the polls for the primary did not see any harm in Senator Butler's votes against the Reciprocal Trade Agreement Act, against the Bretton Woods Agreement, and against the British loan, insofar as they were actively for these things themselves, they just didn't think them as important as pensions for Omaha policemen and relentless baiting of the remnants of the New Deal.

IT is an open secret that the British loan might not have got through Congress at all but for increasing uneasiness about what Russia is up to. Not much was said about it till the final days in the House, but continued diplomatic friction with Russia led to support by a number of Congressmen whose fiscal sense was outraged by the idea of a large interest-waiving loan to a former defaulter.

However, few Americans think in the balance-of-power terms traditional in Europe. Most American Russophobes are Anglophobes and general xenophobes as well. Many have never been thoroughly exposed to balance-of-power thinking; and of those who have, most think it immoral and un-American, as Woodrow Wilson did. According to background and temperament, Americans divide into: (1) internationalists who think balance-of-power politics must be transcended by international organization; (2) isolationists who think that the United States can stay out of it by minding its own business; and (3) imperialists who think the United States can lick the world if necessary, and should get itself into po-

(CONTINUED ON PAGE 146)

Industrial Briefs...

• **FRENCH MERGER**—The French National Assn. for Economic Expansion has merged with the Assn. for Markets Researches in foreign countries so as to intensify the study of the economic situation of foreign countries and the prospects of exports.

• **BUYS THREE PLANTS**—Three of the seven plants used during the war by Walter Kidde & Co., Inc. at Belleville, N. J., have been purchased from the government for a total price of \$1,800,000, it has been announced.

• **NEW CHAPTER**—Phillip Noll, Sr., of Noll Equipment Co., was elected chairman of the new Cleveland chapter of the Machinery Dealers National Assn. An invitation to file an application for membership in the association was extended to all Cleveland dealers by the chairman.

• **NEW PLANT**—A 21½-acre site has been acquired in Hempstead, L. I., N. Y., by General Bronze Corp. where a \$2,000,000 factory will be built by the company.

• **CONSOLIDATES DIVISIONS**—The American Smelting & Refining Co. has announced consolidation of the operations of its Lead Products Div. with those of its Federated Metals Div. Federated, has for a number of years, conducted extensive business in nonferrous alloys of lead, tin, antimony, copper, zinc, aluminum and magnesium under the direction of Mr. E. L. Newhouse, Jr., president.

• **CHANGE OF ADDRESS** — The Allegheny Ludlum Steel Corp. announces the re-location of its executive offices in the Henry W. Oliver Bldg., Pittsburgh.

• **BUCKEYE EXPANDS**—Buckeye Laboratories Corp., recently acquired the plant formerly owned by Morgan Steel Products, Inc., located at 6708 Morgan Ave., Cleveland 4.

• **NEW MEMBERS** — Assn. of Steel Distributors, Inc., has announced the following additional firms elected to membership: Virginia Scrap Iron & Metal Co., Inc., Roanoke, Va.; Viking Steel Co., Cleveland; Commercial Metals Co., Ltd., Dallas; California Metals Co., Oakland, Calif.; Price Iron & Steel Co., Chicago.

• **DEALERS APPOINTED**—Denison Engineering Co., Columbus, Ohio, has appointed Briggs-Weaver Machinery Co., Dallas, Noland Co., Chattanooga, and B & W Machine Co., Inc., Indianapolis, exclusive dealers in their respective territories for handling the Denison line.

• **TO DOUBLE OUTPUT**—The new Cheektowage plant of Westinghouse Electric Corp. will double production of electric motors in August, according to the company. This month's schedule calls for 4000 daily compared with 2000 in July. Delays in deliveries of new machine tools and the shortage of copper wire have put the plant behind schedule.

• **JOINS RESEARCH STAFF**—Dr. W. C. Newell, formerly on the staff of the Brown-Firth Research Laboratories, Sheffield, England, has been appointed head of the steel castings division of the British Iron & Steel Research Assn. E. L. Diamond has been appointed mechanical engineer to the plant engineering division of the association. M. W. Thring has been appointed head of the physics department and Dr. L. N. Bramley has been appointed electrical engineer to the plant engineering division.

• **ST. PAUL OFFICE**—Independent Pneumatic Tool Co., Chicago, announces the opening of a new branch sales office in St. Paul, Minn., located at 220 W. Seventh St., and is managed by Joseph A. Bell, for the past 6 yr sales representative of the company in that area.

U. S. Steel Publishes New Stainless Extras

Pittsburgh

••• The new list of extras of United States Steel Co.'s stainless steels, dated Apr. 2, 1946, replaces the previous edition dated Apr. 1, 1940, and incorporates many of the changes that have been inaugurated but not compiled during the past 5 yr. These changes in extras cover sheets, plates, hot-rolled bars and wire, and cold-rolled strip. The extras listed include products of American Steel & Wire Co., and Carnegie-Illinois Steel Corp.

The following are some of the major changes in the new listing: Thickness ranges on the gage and finish extras on sheets have been revised and new ranges have been added. Also, there have been changes made in thickness ordering ranges, packaging extras, and high tensile extras on sheets. Machine cutting extras have been set up on a cents per square inch basis on plates.

Aircraft quality extras for Magnaflexing have been established on hot-rolled bars and forgings and on cold-finished bars and wire.

New round and square size extras and new extras on flat sizes have been established on cold-finished bars and wire. Revisions have been made in the width ranges in the wider coil classification on hot-rolled coiled strip. Additional size extras for certain thicknesses and width ranges on cold-rolled strip, coiled and cut lengths, have been set up, and new width ranges have been established on high tensile cold-rolled strip.

New England Faces Serious Car Shortage

Boston

••• Pointing out that one New England railroad is already threatened with prosecution for alleged failure to send empty freight cars outside New England, even while local industries were seeking to secure cars for loading, William H. Day, general chairman of the New England Shippers Advisory Board recently warned that this section of the country is facing "the worst shortage of box cars ever experienced."

Construction Steel...

New York

• • • Fabricated steel awards this week included the following:

- 1100 Tons, Seattle, Wash., Frederick Nelson building enlargement, through Strand & Sons, to Northwest Rolling Mills.
- 698 Tons, Los Angeles, regulating gates for Davis Dam, Bureau of Reclamation, Denver, Spec. 1322, to Consolidated Steel Corp.
- 650 Tons, Mexico, 80-ft truss span, through U. S. Steel Export Co., to Virginia Bridge Co., Roanoke, Va.
- 650 Tons, Philadelphia, Smith, Kline & French, laboratory building, to Bethlehem Steel Co., Bethlehem, Pa.
- 300 Tons, Orange, Tex., addition to Sabine Works of E. I. du Pont de Nemours Co., to Virginia Bridge Co., Roanoke, Va.
- 300 Tons, Burley, Idaho, Snake River bridge, through Hansen Construction Co., to Bethlehem Pacific Coast Steel Corp., San Francisco.
- 275 Tons, King County, Wash., P. S. H. 15 crossing over Great Northern Railway tracks, through Neukirch Bros., to Northwest Rolling Mills.
- 260 Tons, Clement, Pa., Reading Co., bridges, to American Bridge Co., Pittsburgh.
- 250 Tons, Jenkintown, Pa., manufacturing building for Standard Pressed Steel Co., to Belmont Iron Works.
- 200 Tons, Seattle, civil engineering building, University of Washington, through Strand & Sons, to Northwest Rolling Mills.
- 190 Tons, Fryeburg, Me., state bridge, to American Bridge Co., Pittsburgh.
- 150 Tons, Newport, Vt., state bridge to Bethlehem Steel Co., Bethlehem, Pa.
- 120 Tons, Philadelphia, U. S. Navy Yard, catapult building additional contract, to American Bridge Co., Pittsburgh.
- 120 Tons, Harrisburg, Pa., service building for State Equipment Co., to Phoenix Bridge Co., Phoenixville, Pa.

• • • Fabricated steel inquiries this week included the following:

- 900 Tons, Chicago, Ill., Indiana Edison Corp., building.
- 800 Tons, Sault Ste. Marie, Mich., power plant.
- 700 Tons, Philadelphia, steel water pipe for City of Philadelphia Water Bureau, bids due Aug. 7.
- 575 Tons, Grand Junction, Colo., steel face for reservoir.
- 500 Tons, Robinson, Ill., cracking plant, Ohio Oil Co.
- 300 Tons, Chicago, Ill., building, Weinberger Corp.
- 300 Tons, Oppossum, Va., power station for Virginia Electric Co., Stone & Webster Engineering Corp., Boston, engineers.
- 280 Tons, Philadelphia, building, for Piasecki Helicopter Co., bids rejected and opened for rebidding.
- 200 Tons, Cambria County, Pa., Route 53 bridge, Pennsylvania Dept. of Highways, bids rejected.
- 180 Tons, Montgomery County, Pa., Route 158 Section 2 bridge, Pennsylvania Dept. of Highways, bids rejected for the third time. This is consistent with recent experience of the department and is due to the fact that bids generally exceed preliminary estimates by the department or to a lack of bidders.
- 150 Tons, Bridgeport, Conn., boiler plant for Bridgeport Brass Co., Stone & Webster Engineering Corp., Boston, engineers.
- 120 Tons, Cambria County, Pa., Route 221, Section A, bridge, Pennsylvania Dept. of Highways, bids due Aug. 9.

• • • Reinforcing bar awards this week included the following:

- 100 Tons, Burley, Idaho, Snake River bridge, through Hansen Construction Co., to Bethlehem Pacific Coast Steel Corp., San Francisco.

• • • Reinforcing bar inquiries this week included the following:

- 1500 Tons, South Boston, government housing project.
- 720 Tons, Long Beach, Calif., Willow St. bridge over Los Angeles River, City Manager, Long Beach, Spec. R-1486, bids open Aug. 21.
- 500 Tons, Louise, Ariz., miscellaneous bars, Bureau of Reclamation, Denver, Inv. 7352-A, bids open Aug. 9.
- 263 Tons, Northport, Wash., Columbia River

Can Making Capacity To Be Boosted by 20 Pct

New York

• • • To meet the growing demand for products packaged in cans, the canning industry is planning a 4 to 5 yr expansion program that will boost can manufacturing capacity by about 20 pct, according to the Can Manufacturers Institute. Can production prior to the war was about 17,000,000,000 cans a year, consuming some 3,000,000 tons of tinplate. Thus, an expansion of 20 pct in can producing facilities will output to about 20,500,000,000 units a year with tinplate consumption approaching 3,600,000 tons.

Material shortages, especially in the construction and machinery fields, are holding up expansion of can making facilities. Various announced projects by can manufacturers are awaiting a further easing of this material supply situation.

WAA to Hold Valve Sale

Washington

• • • To be conducted by its 33 regional offices, WAA has announced a national sales program for the disposal of surplus valves and pipe fittings which originally cost the government upwards of \$100 million. The standard commercial items, approximately one-third of the total inventory, will be sold at fixed prices, based on jobbers' current net cost, less 40 pct discount, f.o.b. location. The remainder, or special types, will be offered on a sealed bid basis.

The valves, of steel, bronze and cast iron, include a full range of pressure ratings. Gates, globes and checks are represented in all

and Great Northern Railway highway bridges, Director of Highways, Olympia, bids open Aug. 13.

- 169 Tons, Mountain Home, Idaho, miscellaneous bars, Bureau of Reclamation, Denver, Inv. 22,727-A-1, bids open Aug. 9.
- 156 Tons, Colorado Springs, Colo., bridge on state highway 83, State Highway Engineer, Denver, bids open Aug. 7.

• • • Steel plate awards this week included the following:

- 300 Tons, Tiverton, R. I., tank for Pacific Oil Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 120 Tons, Seekonk, R. I., standpipe, to Pittsburgh-Des Moines Steel Co.

categories. The fittings, of welded steel, cast steel, malleable iron, bronze and cast iron, come in all pressure ratings, from 100 to 3000 lb.

Iron and Steel Priorities Aid Set Up for Canada

Washington

• • • Canadian applicants for priority assistance to obtain steel used in housing products and farm machinery must now apply to the Civilian Production Administration for such aid, the agency announced on Aug. 1. At the same time, priorities aid to obtain pig iron was extended to Canadian manufacturers of farm equipment and housing products.

Formerly, Canadian farm machinery and housing equipment manufacturers were allowed to certify direct to the steel mills that they were making the required products and in this manner they obtained priorities on steel mill schedules similar to those obtained by American manufacturers.

Application to CPA must be made on Form CPA-4466 and must be accompanied by a letter to the agency explaining the need for priorities assistance.

This change has been effected through an amendment to Direction 12 of order M-21, which will expire at the end of third quarter. Another change in the amended direction adds "peanut pickers" to the list of farm machinery entitled to certification assistance.

Canadian manufacturers of farm machinery and housing products can now obtain priorities assistance in obtaining pig iron, through an amendment to Direction 13 of M-21.

MACHINE TOOLS

... News and Market Activities

Industry Fears Sales of Surplus Tools

... There is a growing suspicion among the machine tool industry's more active segments that sales of government-owned surplus machine tools will hit the market harder in the next 6 months than at any time since War Asset Administration set up shop.

This suspicion is well grounded in fact. Under the diminishing price scale of the Clayton formula, many machines which have not been attractive in the past are now developing an interesting lustre to prospective purchasers. There is also the WAA's new merchandising technique, the site sale, which thus far has had speedy and good results.

But possibly most important of all is the number of good, well-maintained machines on lease from the government in war contractor's plants. While it would be an extremely difficult task to estimate the number of these machines accurately, it is not impossible that this category may make up as much as 30 pct of the surplus. At present, some machine tool builders feel that these machines are in abeyance; if business is good, they may never return to the market until they're obsolescent, but if business is bad, the debut of these machines in the postwar market can be readily expected.

War contractors leased these machines on the assumption, obviously, that steel and other materials would be at least in reasonable supply, if not plentiful, and that production for an unprecedented demand would support the move. In many cases this has not been true; business, because of shortages and strikes has been anything but good, and the machines are beginning to take on some of the appearance of a liability.

Some observers believe that the Army and Navy will draw heavily from this pool of machines for filling in stand-by tool requirements. This, however, may be merely wishful thinking since no definite moves toward establishment of a pool of reserve machines has thus far been made. Requirements for the stand-by pool are as nebulous, apparently, as the pool itself.

These factors pose a situation for

builders who are without means for cushioning the shock. Most of the industry, according to qualified observers, is in sufficiently strong financial position to ride out what may be an impending storm. Some few are not so situated and consolidations, mergers and the mortality rate may be expected to increase accordingly.

At the same time, things have not been getting any easier for many of the dealers. Those who have taken strongest hold on the surplus sales program had their commissions temporarily held up. But the end of that situation did not see an improvement in deliveries, some of which are running 26 weeks, and longer. Bearings and motors are still in short supply.

Thus far, the industry has had a difficult time getting up to shipments of \$30,000,000. June shipments amounted to \$28,490,000, of which \$6,300,000 was foreign or 24 pct of the total. New orders totaled \$25,580,000, of which \$9,300,000 or 32 pct were foreign. Cancellations amounted to \$1,632,000, of which \$370,000 or 22.9 pct were foreign. Unfilled orders stood at \$183,400,000, with \$54,400,000 or 29 pct of this amount from foreign customers.

Summer quiet has settled over the Cincinnati machine tool market, as it has over a number of other places. Plant-wide vacations are in full swing and production this week is expected to be somewhat impeded by the vacation schedules. Shipments during the latter part of July were commensurately larger as many plants pressed to make deliveries before vacation periods.

Generally, new business is reported fair, with domestic ordering out-distancing foreign, with the general demand covering all types of machines, possibly reflecting a still-strong movement for retooling. Backlogs are still good, but the plants are eating into them heavily. In the East, July sales in some instances ran ahead of those for June, but those firms so reporting are definitely in the minority. The rank and file did no more business and sometimes less than in June. July production and shipments

were handicapped by vacations. Little if any foreign business was booked in July on regular items, and the outlook for August is somewhat problematical.

Cleveland Tapping Machine Co. has been sold to W. R. Harrison, William Hamaker and A. R. Wise, Canton, Ohio, businessmen. Mark Graves, who started the company, is still associated with it in an advisory capacity as a vice-president. The company is currently producing ten tapping machines a month, and according to Mr. Harrison, expects to double that production as soon as materials become readily available.

The 28-week-old strike at the Cincinnati Bickford Tool Co. ended this week and the company hopes to resume full production on Monday of next week.

Greenfield Tap & Die Corp. showed net income for the quarter ended June 30 of \$277,695 as against \$167,730 in the corresponding 1945 quarter. Van Norman Co. earned \$528,316 in the first half of 1946, including dividends from Morse Twist Drill & Machine Co., 98 pct owned by Van Norman.

Blasts Bearing Makers

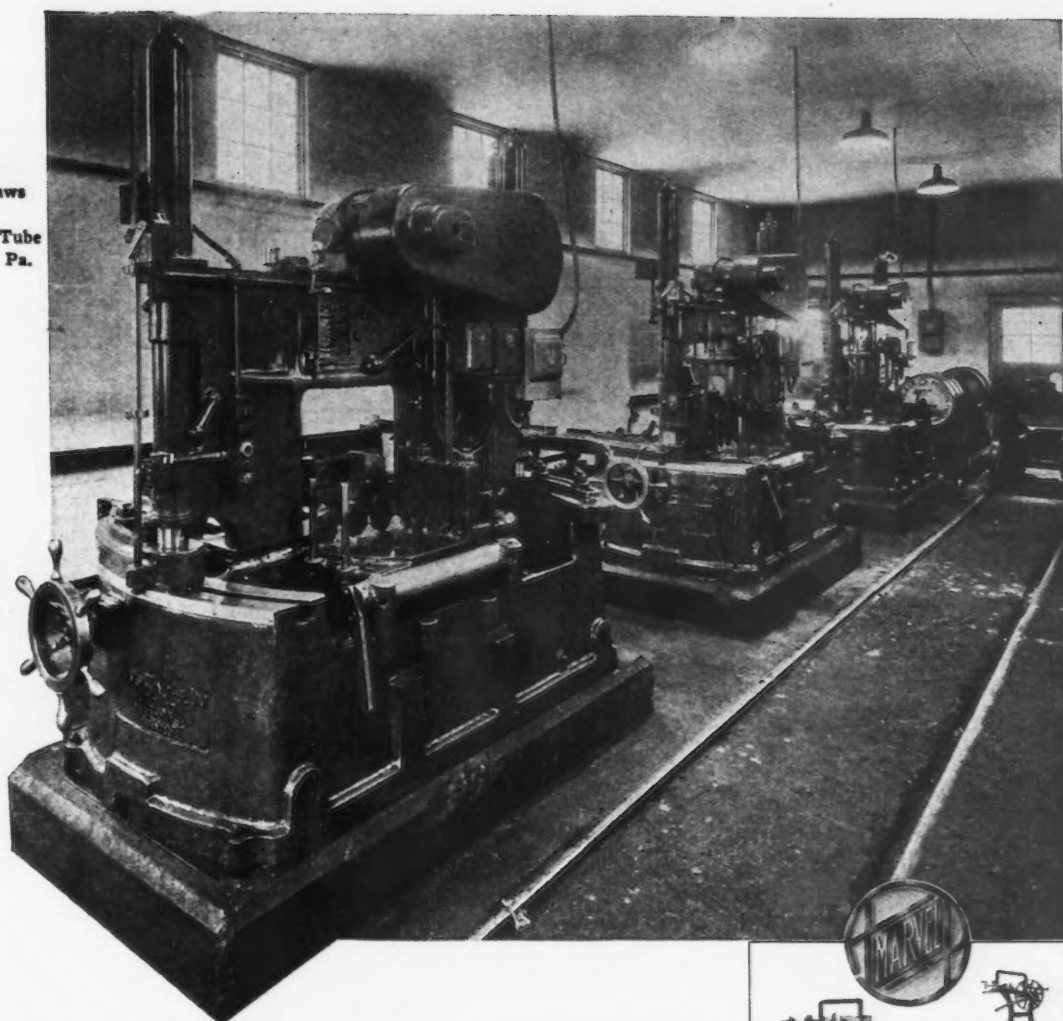
Washington

... Attorney General Tom C. Clark announced the filing in Cleveland of three civil actions charging three American and one foreign antifriction bearings companies with cartel agreements controlling world-wide markets. Separate law suits were filed against the following companies: Timken Roller Bearing Co., Canton, Ohio; SKF Industries, Inc., Philadelphia, and Aktiebolaget Svenska Kullagerfabriken, Gothenburg, Sweden; and Norma-Hoffman Bearings Corp., Stamford, Conn.

Commenting on the cases, Attorney General Clark stated, "These cases are spearheads in the Justice Department's drive for a free and expanding postwar economy."

The complaints allege that the bearing production of the three American companies totals approximately \$125,000,000 a year.

3 MARVEL #18
Hydraulic Hack Saws
at the
Babcock & Wilcox Tube
Co., Beaver Falls, Pa.



EASILY CUT-OFF TOUGHEST STEELS

Steels just don't come too tough for MARVEL Giant Hydraulic Hack Saws. Take, for example, the three No. 18 MARVEL Saws, at the Babcock & Wilcox steel mill, shown above. These machines are used to cut test specimens from sample pieces of stainless and other tough alloy billets which are checked for seams, pipes, etc., before being drawn into tubing. It takes tough steel to make the best tubing, and it takes modern sawing equipment to cut it rapidly, accurately and economically.

With 10 types of metal-cutting saws, each available in a series of variations, MARVEL can furnish sawing machines that exactly meet your requirements. If you have a metal-sawing problem—call in the local MARVEL Sawing Engineer.

Write for MARVEL Catalog or check
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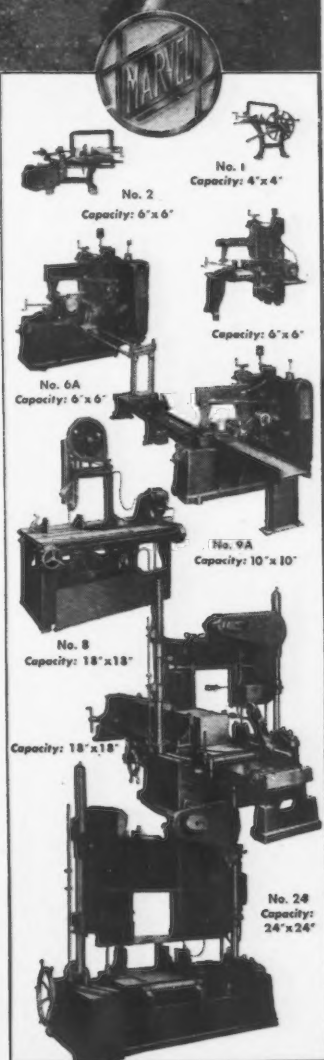
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Eastern Sales Office: 225 Lafayette St., New York 12, N. Y.



NONFERROUS METALS

... News and Market Activities

Premium Price Plan

Retroactive to June 30

Washington

• • • Payments under the recently extended Premium Price Plan for copper, lead and zinc will be retroactive to June 30, 1946, under an OWMR directive. Extension of this program to June 30, 1947, was included in the OPA bill, and \$100,000,000 was made available for premium payments.

Approved wage and salary increases recently granted by mine operators will be taken into consideration in the payment of premium prices for copper and lead in accordance with commitments made by the Office of Economic Stabilization.

Under an OES directive, some operators who had not previously received premium payments; will become eligible for them as a result of reduced operating margins due to retroactive wage increases.

The Quota Committee will revise quotas where changes in total income of mine operators justify such action.

Positive quotas for July will be revised to compensate for production losses by reduced operations and shutdowns during the time the Premium Price Plan was suspended. Deficits in positive quotas which occurred during this period will not be carried forward.

Lead

• • • The RFC has announced that the lead stockpile amounts to 31,000 short tons. In the opinion of its counsel it is now in a position to purchase foreign lead which will, of course, have to be concluded at current world prices for lead which are well above domestic ceiling prices.

Some lead producers are accepting orders for delivery based on the prices quoted by the *Engineering and Mining Journal*, *Metal and Mineral Markets* at the time of shipment. Customs smelters are not taking orders at ceiling prices for they would stand a considerable loss in selling lead at ceilings which was bought in on a free market basis.

CPA has distributed by allocation the 25 pct of August production set aside for that purpose by the producers. The same procedure will be followed in September but the percentage figure has not yet been definitely established in the knowledge of producers. While the industry is considerably handicapped in supplying its customers with lead due to the price rollback to ceiling levels, and pressure by customs smelters and secondary smelters is sure to be applied to ease the problem, there is little hope for an early price modification due to the established procedure for obtaining OPA increases.

Zinc

• • • RFC has released figures on the government stockpile of slab zinc which totals 222,027 short tons. This metal consists of the following grades: Prime Western, 51,998 tons; Brass Special, 15,084 tons; Intermediate, 5595 tons; High Grade, 146,550; and Special High Grade, 2800 tons. Although these tonnages are significant there is a lack of balance in the grades shown with Prime Western, used by galvanizers, accounting for less than 25 pct of the total tonnage.

The purer grades of zinc cannot be used for this purpose because the impurities contained in Prime Western aid in the deposition of a smooth coating by increasing the

Monthly Average Prices

New York

• • • The average prices of the major nonferrous metals in July, based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Lb.
Electrolytic copper, Conn. Valley	14.375
Lake copper, Conn. Valley	14.375
Straits tin, New York	52.00
Zinc, East St. Louis..	9.25
Zinc, New York.....	9.68
Lead, St. Louis.....	9.10
Lead, New York.....	9.25

fluidity of the melt. In order to enlarge the tonnage of Prime Western available to galvanizers it would be necessary to debase the better grades with other metals and this would be a somewhat expensive operation to undertake. In the meantime while it would seem that consumers should be able to get all the zinc needed, this unbalanced situation is making it difficult for galvanizers and die casters. One zinc producer is still on strike and customs smelters are still unable to sell metal at established ceiling prices lest a significant loss be sustained.

Sets Single Copper Price

Washington

• • • The dual system of copper prices, which resulted from raising the price of copper from mines which had granted approved wage increases, 2-3/8¢ per lb June 3, 1946, has been eliminated, OPA announced on Aug. 2.

The maximum base price for all electrolytic, lake or other fire refined copper delivered in carload lots at Connecticut Valley points, is now 14-3/8¢ per lb.

Because almost all of the industry has now settled its wage issues and given approved increases, a wage pattern has been established conforming with the wage cost factors used in granting the advance.

Nonferrous Metals Prices

Cents per pound

	July 31	Aug. 1	Aug. 2	Aug. 3	Aug. 5	Aug. 6
Copper, electro., Conn.	14.375	14.375	14.375	14.375	14.375	14.375
Copper, Lake, Conn.	14.375	14.375	14.375	14.375	14.375	14.375
Tin, Straits, New York	52.00	52.00	52.00	....	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25	8.25	8.25
Lead, St. Louis	8.10	8.10	8.10	8.10	8.10	8.10

NONFERROUS PRICES

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb)	15.00
Aluminum pig, f.o.b. shipping point	14.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be.....	\$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be.....	\$30.00
Cadmium, del'd	\$1.25
Cobalt, 97-99% (per lb).....	\$1.50 to \$1.57
Copper, electro, Conn. Valley	14.375
Copper, electro, New York	14.125
Copper, lake, Conn. Valley	14.375
Gold, U. S. Treas., dollars per oz.	\$35.00
Indium, 99.8%, dollars per troy oz.	\$ 2.25
Iridium, dollars per troy oz.	\$125.00
Lead, St. Louis	8.10
Lead, New York	8.25
Magnesium, 99.9 + %, carlots.....	20.50
Magnesium, 12-in. sticks, carlots.....	27.50
Mercury, dollars per 76-lb flask, f.o.b. New York	\$99 to \$100
Nickel, electro, f.o.b. refinery	35.00
Palladium, dollars per troy oz.	\$24.00
Platinum, dollars per troy oz.	\$70.00
Silver, New York, cents per oz.	90.125
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.69
Zirconium copper, 6 pct Zr, per lb contained Zr	\$ 6.00

Remelted Metals

(Cents per lb)

Aluminum, No. 12 Fdy. (No. 2)	11.50 to 12.00
Aluminum, deoxidizing	
No. 2	12.50
No. 3	11.50
No. 4	10.50
Brass Ingot—ceiling prices	
85-5-5-5 (No. 115)	15.50
88-10-2 (No. 215)	18.75
80-10-10 (No. 305)	18.25
No. 1 Yellow (No. 405)	12.50

Copper, Copper Base Alloys

(Mill base, cents per lb)

	Extruded shapes	Rods	Sheets
Copper	25.66	25.81	
Copper, H.R.	22.16		
Copper drawn	23.16		
Low brass, 80%	24.35	24.66	
High brass	24.38		
Red brass, 85%	24.67	24.98	
Naval brass	23.84	22.59	28.53
Brass, free cut	18.53		
Commercial, bronze	25.50	25.81	
Manganese bronze	27.45	25.95	32.03
Phosphor bronze, A,			
B, 5%	43.68	13.43	
Muntz metal	23.59	22.34	26.78
Everdur, Herculey,			
Olympic or equal.	29.82	30.88	
Nickel silver, 5%	34.44	32.38	
Architectural bronze.	22.50		

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢ 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb and over.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb and over.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 27.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢ 1 in., 2 in., 27¢; base, 5000 lb. Rod: 2S, 3S, 1 ¼ to 2 ½ in. (Continued, See Next Column)

diam, rolled, 23¢; cold-finished, 23.5¢ base, 30,000 lb. Round Wire: drawn, coiled, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base; B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢; B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

NONFERROUS SCRAP METAL QUOTATIONS

†(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper...	11.50
No. 1 tinned copper wire, No. 1 tinned heavy copper	11.50
No. 2 wire, mixed heavy copper...	10.50
Copper tuyeres	10.50
Light copper	9.50
Copper borings, No. 1	11.50
No. 2 copper borings	10.50
Lead covered copper wire, cable.	*
Lead covered telephone, power cable	*
Insulated copper	*

OPA Group 2†

Bell metal	17.25
High grade bronze gears.....	15.00
High grade bronze solids	*
Low lead bronze borings	*
Babbitt lined brass bushings	14.75
High lead bronze solids	*
High lead bronze borings	*
Red trolley wheels	12.50
Tinny (phosphor bronze) borings.....	12.25
Tinny (phosphor bronze) solids.....	12.25
Copper-nickel solids and borings.....	11.00
Bronze paper mill wire cloth	11.25
Aluminum bronze solids	10.75
Soft red brass (No. 1 composition) ..	10.75
Soft red brass borings (No. 1).....	10.75*
Gilding metal turnings	10.25
Contaminated gilded metal solids.....	10.25
Unlined standard red car boxes.....	10.00
Lined standard red car boxes.....	9.50
Cocks and faucets	9.50
Mixed brass screens	9.50
Red brass breakage	9.25
Old nickel silver solids	7.60
Old nickel silver borings	7.50
Copper lead solids, borings	6.75
Yellow brass castings	7.50
Automobile radiators	8.75
Zincy bronze solids, borings	9.75

OPA Group 3†

Fired rifle shells	9.50
Brass pipe	8.75
Old rolled brass	8.25
Admiralty condenser tubes	8.75
Muntz metal condenser tubes	8.25
Plated brass sheet, pipe reflectors ..	7.75
Manganese bronze solids	8.00 ¹
Manganese bronze solids	7.00 ²
Manganese bronze borings	7.25

OPA Group 4†

Refinery brass	6.00*
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*Price varies with analysis. ¹Lead content 0.00 to 0.40 pct. ²Lead content 0.41 to 1.00 pct.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb or more, 46¢ a lb; 25 to 90 lb, 56¢; less than 25 lb, 66¢.

Brass Mill Scrap

Briquetted cartridge brass turnings	10.375
Cartridge brass turnings, loose.....	9.625
Loose yellow brass trimmings.....	9.625

Aluminum

Plant scrap, segregated

2S solids	8.50 to 9.00
Dural alloys, solids 14, 17, 18, 24S, 25S	6.00 to 6.25
turnings, dry basis	1.50 to 1.75
Low copper, alloys 51, 52, 61, 63S solids	8.00 to 8.50
turnings, dry basis	6.00 to 6.50

Plant scrap, mixed

Solids	4.25 to 4.50
Turnings, dry basis	1.50 to 1.75

Obsolete scrap

Pure cable	6.50 to 7.50
Old sheet and utensils.....	5.00 to 5.50
Old castings and forgings.....	5.00 to 5.50
Pistons, free of struts	4.00 to 4.50
Pistons, with struts	2.50 to 3.00
Old alloy sheet	2.00 to 2.50

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt Borings and turnings	1.50
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Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings.....	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings ...	7.50
Engravers, lithographers plates ...	7.50
Old zinc scrap	5.75
Unsweetened zinc dross	6.00
Die cast slab	5.50
New die cast scrap	5.45
Radiator grilles, old and new	4.50
Old die cast scrap	4.00

Lead

Deduct 1.40¢ a lb from refined metal basing point prices for refinery charge on used battery plates.
Soft lead scrap 7.50 |

Nickel

Ni content 98+%, Cu under ¼%, 23¢ per lb; 90 to 98% Ni, 23¢ per lb contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	29.75
Electrodeposited	23.47
Rolled, oval, straight	23.97
Curved, 18 in. or longer	23.97
Brass, 80-20, frt allowed	
Cast, oval, 15 in. or longer.....	27.25
Zinc, cast, 99.99, 15 in. or longer..	16 ½
Nickel, 99 pct plus, frt allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 100 oz. lots, per oz.....	80 ¾

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 1-5 bbls	34.00
Copper sulphate, 99.5, crystals, bbls	7.75
Nickel salts, single, 425 lb bbls, frt allowed	13.50
Silver cyanide, 100 oz lots, per oz.	0.655
Sodium cyanide, 96 pct, domestic, 100 lb drums	15.00
Zinc cyanide, 100 lb drums	33.00
Zinc sulphate, 89 pct, crystals, bbls, frt allowed	6.35

SCRAP

... News and Market Activities

Volume Poor as Price Hopes Throttle Trade

New York:

... Price rumors continued to plague the scrap industry while steel sources indicated a further reduction in furnaces due to the shortage. Though they may be guilty of wishful thinking there is no doubt that a number of normal scrap sources are not delivering the goods because they feel there may be a price increase.

C. M. White, president, Republic Steel Co., and a director of the American Iron & Steel Institute, stated that there were between 25 and 30 openhearth down for lack

News of the start of the shipbreaking program appears on p. 104 of this issue.

of scrap. The Scrap Institute's National Affairs Committee scheduled a meeting early this week in Cleveland with the price question in the foreground.

Despite the scrap shortage the steel industry has been able to maintain operations at remarkably high levels. Because of this winter stockpiling is not possible at this time. However, it is believed that the shipbreaking program will begin to make itself felt before winter is too far advanced.

Observers here long ago predicted that production scrap could be expected to flow in volume once industry could settle down to a reasonable period of uninterrupted production. These sources were quick to note that both Cleveland and Pittsburgh had noted a slight upward trend in the volume of industrially generated scrap. They pointed out too that this material, while insufficient in itself to fill the demand, is less affected by the price problem than that from urban and rural areas which normally flows through the underpaid and almost non-existent "junkie."

PITTSBURGH—Scrap is still in extreme short supply in this district, but as yet no steel production has been lost. Some observers feel that this past week saw a very slight turn for the better in the acute shortage, but not enough to indicate any trend. Yards are having trouble getting railroad cars, the same as mills. Scrap lists this week look better. Cast scrap, which sold for as high as \$24 during July, has been completely cleaned out, and the foundry scrap situation is critical.

No relief on this score is in sight for at least 45 days.

CHICAGO—Supplies of scrap being shipped to consumers remain at the same low level. Although there seems a little more interest on the part of the dealers in talking delivery, the actual flow has failed to increase. One plant in the area still has seven openhearth down because of the shortage. Railroad scrap is being moved as fast as it is being accumulated, but difficulties in railway equipment replacements have held down quantities. Large amounts of potential scrap which, it is felt, are being held by various government agencies, have not appeared.

PHILADELPHIA—Steel scrap is not moving in significant volume here, and both mills and dealers agree that the situation in scrap and pig iron is growing increasingly acute. Some mills have been forced to take off furnaces due to the shortages. Mills are eating into their reserves rapidly which should be growing now to meet winter needs. Since the return of OPA all movement of cast scrap at legitimate prices is reported to have stopped. However, it appears that some deals continue to be arranged. It is significant that there was a Navy Yard sale of 50 gross tons at a price of \$25.27 on July 29, after the return of OPA. It is understood that there was a meeting of the Scrap Institute's national affairs committee in Cleveland on Tuesday which dealt mostly with the problem of scrap prices. However, it is doubtful if there are significant tonnages of prepared or unprepared scrap now in dealers yards which, except for an initial flurry, would be freed by price action.

DETROIT—With the reincarnation of OPA scrap flow in this area showed definite signs of life but early gains have not been maintained. Lists for the month of August show no change and it is now believed that at least two more months will elapse before pressure on dealers is measurably relieved. Chrysler has submitted no lists for several months and is either consuming its own scrap or directing it to certain mills. Chevrolet is selling scrap in the market this month instead of allocating it to Saginaw. Practically all industrial scrap that moves in quantity is earmarked for mills and there is no indication that scrap hoarding is going on in appreciable quantities.

BOSTON—As for new sales, the trade is sitting on its thumbs. Local railroad agents report no call for empty cars in more than a week. Yards are accumulating scrap and waiting for a revision in prices, and therein lies the gist of trade talk. Some believe there will be an upward revision; others there will not be; everybody that a revision should be made; everybody that it is a case of sitting out Washington regardless of accumulating yard stocks.

NEW YORK—Brokers here are shipping about 40 pct of requirements of steel scrap and report no improvement in sight. It is admitted that a certain amount of material is still being held for a higher price. If a sufficient increase were to come, trade sources say, the return from the "junkie" would be substantially increased. Normally a fruitful source in this urban area, the itinerant peddler no longer plies his trade here.

BIRMINGHAM—Scrap is practically unobtainable, although the shortage has not yet cut steel production. Most observers predicted the shortage would have shown up by this time in the production rate. OPA ceiling prices continue to be offered but what scrap exists is being held, for the most part, in local yards and little preparation is evident.

CINCINNATI—The market here is tighter than ever. Brokers and dealers indicate that consumers are clamoring for material and there just is not enough to go around, but that they are shifting the current shipments around in an effort to keep the various plants and foundries operating. One dealer is of the opinion that unless some relief is forthcoming very soon, some plants will have to curtail operations. There is a strong indication that some dealers are holding back on material in anticipation of price increases.

CLEVELAND—While production scrap is beginning to move mills are not getting anywhere near their requirements. Inventories are at very low ebb with one major consumer in the Youngstown district reporting only 500 tons on hand. OPA has been checking shipments made to mills after July 26 for over-grading and according to reports, has found ample evidence. While isolated cases of trading steel for scrap have been reported steelmaking operations are in greater danger of curtailment this week as a result of the scrap shortage than at any time thus far in the current crisis.

ST. LOUIS—Shippers are still holding on to their scrap in the hope of getting higher prices from the OPA and only a few cars are trickling through. Mills are drawing on their stockpiles but are still comfortably fixed for steel although cast iron foundries are in need of supplies. Railroads are specifying to whom shipments of scrap they sell to dealers must be made, a practice which is another but unofficial form of allocation. The railroads action is due to pressure from melters on their lines.

TORONTO—Canadian dealers report further curtailment in offerings, chiefly the result of the steel strike. Some dealers are stockpiling awaiting the settlement of the strikes. Iron scrap, however, is short and is in heavy demand, as melters are endeavoring to offset the shortage of pig iron with larger use of cast scrap and stove plate.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bldd. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	15.00*
Short shov. turn.	17.00*
Mixed bor. and turn.	15.00*
Cast iron borings	16.00*
Hvy. break cast.	16.50*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	13.75*
Short shovels, turn.	15.75*
Cast iron borings	14.75*
Mix. borings & turn.	13.75*
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Angles & splice bars	22.25*
Locomotive tires, cut	24.25*
Cut bolsters & side frames	22.25*
Standard stl. car axles	25.75*
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast.	20.00*
Rails 3 ft. and under	22.25*
No. 1 agricul. cast.	20.00*
Hvy. breakable cast.	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast.	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	\$10.50 to 11.00
Shoveling turn.	12.50 to 13.00
Cast iron borings	11.50 to 12.00
Mixed bor. & turn.	11.50 to 12.00
Low phos. plate	22.00*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Scrap rails	21.00*

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	\$15.05*
No. 2 hvy. melting	15.05*
Nos. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shoveling	12.05*
Machine shop turn.	10.05*
Mixed bor. & turn.	10.05*
Cl'n cast. chem. bor.	\$13.06 to 14.15*
Machinery cast	20.00*
Breakable cast.	16.50*
Stove plate	19.00*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	\$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	12.32*
Short shov. turn.	14.32*

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Where asterisks are used they indicate the OPA ceiling price to which must be added brokerage fee and adjusted freight.

Cast iron borings	13.32*
Mixed bor. & turn.	12.32*
Low phos. plate	19.32*
No. 1 cupola cast.	20.00*
Charging box cast.	19.00*
Hvy. breakable cast.	16.50*
Stove plate	19.00*
Automotive cast.	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	13.75*
Shoveling turn.	15.75*
Cast iron borings	14.75*
Mixed bor. & turn.	13.75*
No. 1 cupola cast.	20.00*
Hvy. breakable cast.	16.50*
Cast, charging box	19.00*
Hvy. axle forge turn.	13.25*
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	\$17.50*
Bundled sheets	17.50*
Mach. shop turn.	12.50*
Locomotive tires, uncut	21.00*
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	24.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 machinery cast	20.00*
Breakable cast	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	12.00*
Shoveling turnings	14.00*
Cast iron borings	13.00*
Bar crops and plate	\$18.50 to 19.50*
Structural and plate	18.50 to 19.50*
No. 1 cast	20.00*
Stove plate	19.00*
Steel axles	18.50*
Scrap rails	18.50*
Rerolling rails	20.50*
Angles & splice bars	20.50 to 21.00*
Rails 3 ft. & under	21.00*
Cast iron carwheels	17.50 to 18.00*

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	15.00*
Short shovel. turn.	17.00*
Cast iron borings	16.00*

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	10.33*
Mixed bor. & turn.	10.33*
Shoveling turn.	12.33*
No. 1 cupola cast.	20.00*

Hvy. breakable cast	16.50*
Charging box cast	19.00*
Stove plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	14.25*
Shoveling turn.	16.25*
Cast iron borings	14.25*
Cast iron borings	15.25*
Mixed bor. & turn.	14.25*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00*
No. 1 bundles	19.50*
Mach. shop turn.	14.50*
Short shovel	16.50*
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	15.50*
Mixed bor. & turn.	14.50*
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	\$18.00*
No. 1 hvy. melting	17.00*
No. 2 hvy. melting	17.00*
No. 2 bales	\$15.00 to 15.75
No. 3 bales	8.50 to 9.25
Mach. shop turn.	6.50 to 7.25
Elec. furn. 1 ft. und.	15.50 to 17.00
No. 1 cupola cast.	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$17.00*
No. 2 hvy. melting	17.00*
No. 1 bales	\$16.00 to 17.00
No. 2 bales	15.50 to 16.00
No. 3 bales	8.00 to 9.00
Mach. shop turn.	7.00
No. 1 cupola cast.	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	\$14.50*
No. 1 & No. 2 hvy. melting	14.50*
Elec. furn. 1 ft. und.	\$14.00 to 15.00
No. 1 cupola cast.	20.00*

HAMILTON, ONT.

Per gross ton delivered to consumer:

Heavy melting	\$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushelings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in Heavy Type; declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel:	Aug. 6, 1946	July 30, 1946	July 2, 1946	Aug. 7, 1945
(cents per pound)	1946	1946	1946	1945
Hot-rolled sheets	2.425	2.425	2.425	2.20
Cold-rolled sheets	3.275	3.275	3.275	3.05
Galvanized sheets (24 ga.)	4.05	4.05	4.05	3.70
Hot-rolled strip				
6-in. and under	2.45	2.45	2.45	2.10
Over 6 in.	2.35	2.35	2.35	2.10
Cold-rolled strip	3.05	3.05	3.05	2.80
Plates	2.50	2.50	2.50	2.25
Plates, wrought iron	4.112	4.112	4.112	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00

Tin and Terneplate:	Aug. 6, 1946	July 30, 1946	July 2, 1946	Aug. 7, 1945
(dollars per base box)				
Tinplate, standard cokes	\$5.00	\$5.00	\$5.00	\$5.00
Tinplate, electro (0.50 lb)	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.55	4.55	4.55	4.30

Bars and Shapes:	Aug. 6, 1946	July 30, 1946	July 2, 1946	Aug. 7, 1945
(cents per pound)				
Merchant bars	2.50	2.50	2.50	2.25
Cold-finished bars	3.10	3.10	3.10	2.75
Alloy bars	2.92	2.92	2.92	2.70
Structural shapes	2.35	2.35	2.35	2.10
Stainless bars (No. 302)	25.97	25.97	25.97	24.00
Wrought iron bars	4.76	4.76	4.76	4.40

Wire and Wire Products:	Aug. 6, 1946	July 30, 1946	July 2, 1946	Aug. 7, 1945
(cents per pound)				
Bright wire	3.05	3.05	3.05	2.75
Wire nails	3.75	3.75	3.75	2.90

Rails:	Aug. 6, 1946	July 30, 1946	July 2, 1946	Aug. 7, 1945
(dollars per net ton)				
Heavy rails	\$43.39	\$43.39	\$43.39	\$43.00
Light rails	49.18	49.18	49.18	45.00

Semifinished Steel:	Aug. 6, 1946	July 30, 1946	July 2, 1946	Aug. 7, 1945
(dollars per gross ton)				
Rerolling billets	\$39.00	\$39.00	\$39.00	\$36.00
Sheet bars	38.00	38.00	38.00	36.00
Slabs, rerolling	39.00	39.00	39.00	36.00
Forging billets	47.00	47.00	47.00	42.00
Alloy blooms, billets, slabs	58.43	58.43	58.43	54.00

Wire Rods and Skelp:	Aug. 6, 1946	July 30, 1946	July 2, 1946	Aug. 7, 1945
(cents per pound)				
Wire rods	2.30	2.30	2.30	2.15
Skelp	2.05	2.05	2.05	1.90

Pig Iron*:	Aug. 6, 1946	July 30, 1946	July 2, 1946	Aug. 7, 1945
(per gross ton)				
No. 2 foundry, Phila.	\$30.43	\$30.34	\$30.34	\$26.84
No. 2, Valley furnace	28.50	28.50	28.50	25.00
No. 2, Southern, Cin'ti.	27.80	28.94	28.94	25.44
No. 2, Birmingham	24.88	24.88	24.88	21.38
No. 2 foundry, Chicago†	28.50	28.50	28.50	25.00
Basic, del'd eastern Pa.	29.93	29.84	29.84	26.34
Basic, Valley furnace	28.00	28.00	28.00	24.50
Malleable, Chicago†	28.50	28.50	28.50	25.00
Malleable, Valley	28.50	28.50	28.50	25.00
L. S. charcoal, Chicago	42.34	42.34	42.34	42.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.
‡ For carlots at seaboard.
* Prices retroactive to May 29; the price increase should be reflected in THE IRON AGE Comparison of Prices table since June 4.

Scrap:	Aug. 6, 1946	July 30, 1946	July 2, 1946	Aug. 7, 1945
(per gross ton)				
Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.32
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00

Coke, Connellsville:	Aug. 6, 1946	July 30, 1946	July 2, 1946	Aug. 7, 1945
(per net ton at oven)				
Furnace coke, prompt	\$7.50	\$8.75	\$7.50	\$7.50
Foundry coke, prompt	8.50	9.85	9.00	9.00

Nonferrous Metals:	Aug. 6, 1946	July 30, 1946	July 2, 1946	Aug. 7, 1945
(cents per pound to large buyers)				
Copper, electro., Conn.	14.375	14.375	14.375	12.00
Copper, Lake, Conn.	14.375	14.375	14.375	12.00
Tin, Straits, New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	8.10	8.10	8.10	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

Composite Prices . .

FINISHED STEEL

Aug. 6, 1946	2.72115¢ per lb.
One week ago	2.72115¢ per lb.
One month ago	2.72115¢ per lb.
One year ago	2.44076¢ per lb.

	HIGH	LOW
1946	2.72115¢ Apr. 2	2.54490¢ Jan. 1
1945	2.44104¢ Oct. 2	2.38444¢ Jan. 2
1944	2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943	2.29176¢	2.29176¢
1942	2.28249¢	2.28249¢
1941	2.43078¢	2.43078¢
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939	2.35367¢ Jan. 3	2.26689¢ May 16
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935	2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934	2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933	1.95578¢ Oct. 3	1.75836¢ May 2
1932	1.89196¢ July 5	1.83901¢ Mar. 1
1931	1.99626¢ Jan. 13	1.86586¢ Dec. 29
1930	2.25488¢ Jan. 7	1.97319¢ Dec. 9
1929	2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON

.....	\$28.13 per gross ton
.....	\$28.12 per gross ton
.....	\$28.12 per gross ton
.....	\$24.61 per gross ton

	HIGH	LOW
28.13	May 29	\$25.37 Jan. 1
25.37	Oct. 23	23.61 Jan. 2
23.61		23.61
23.61		23.61
23.61		23.61
23.61	Mar. 20	23.45 Jan. 2
23.45	Dec. 23	22.61 Jan. 2
22.61	Sept. 19	20.61 Sept. 12
23.25	June 21	19.61 July 6
23.25	Mar. 9	20.25 Feb. 16
19.74	Nov. 24	18.73 Aug. 11
18.84	Nov. 5	17.83 May 14
17.90	May 1	16.90 Jan. 27
16.90	Dec. 5	13.56 Jan. 3
14.81	Jan. 5	13.56 Dec. 6
15.90	Jan. 6	14.79 Dec. 15
18.21	Jan. 7	15.90 Dec. 16
18.71	May 14	18.21 Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo Valley and Birmingham.

SCRAP STEEL

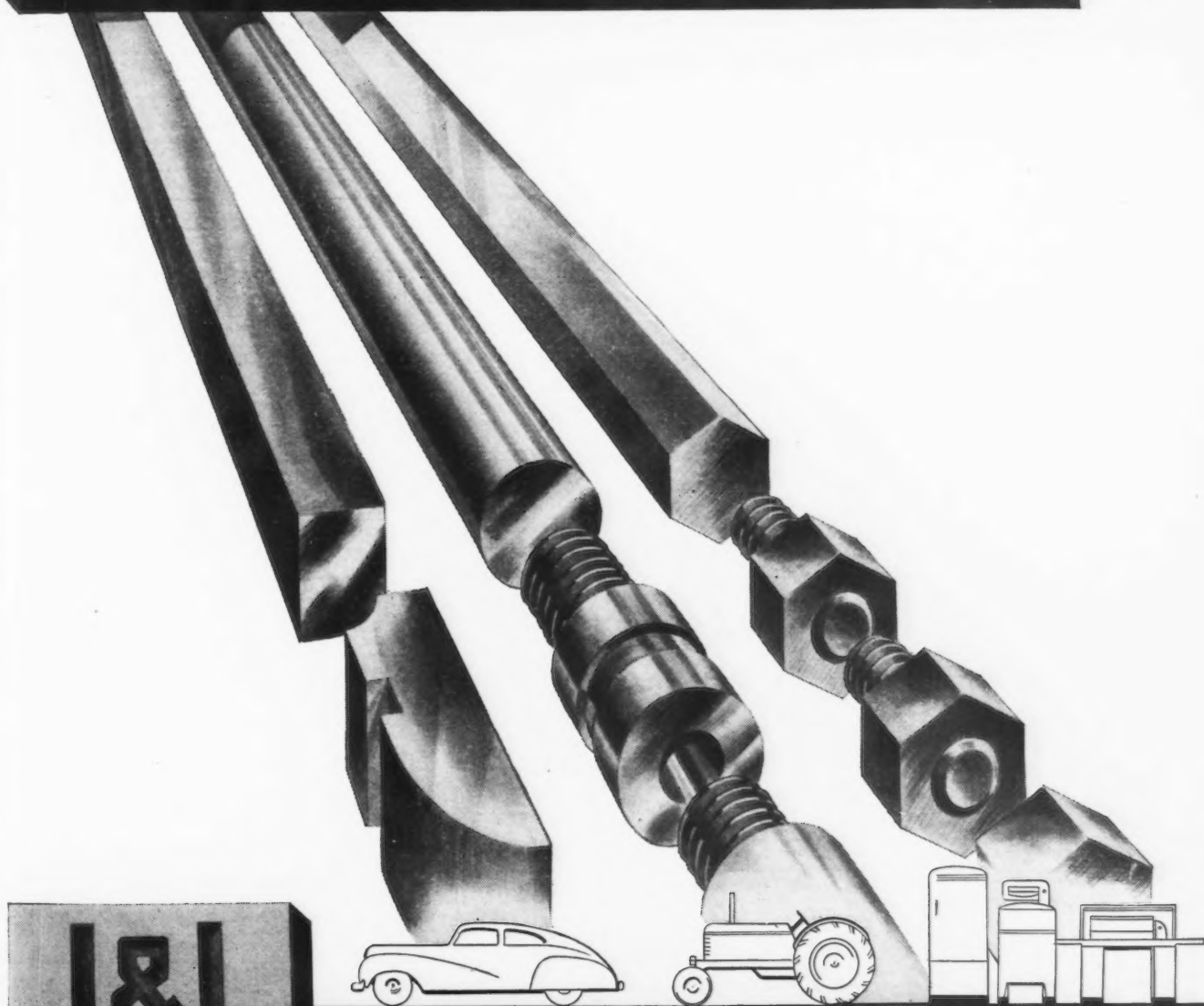
.....	\$19.17 per gross ton
.....	\$19.17 per gross ton
.....	\$19.17 per gross ton
.....	\$19.17 per gross ton

	HIGH	LOW
19.17	Jan. 2	\$18.92 May 22
19.17	Jan. 11	15.76 Oct. 24
19.17		19.17
19.17		19.17
22.00	Jan. 7	\$19.17 Apr. 10
21.83	Dec. 30	16.04 Apr. 9
22.50	Oct. 3	14.08 May 16
15.00	Nov. 22	11.00 June 7
21.92	Mar. 30	12.67 June 9
17.75	Dec. 21	12.67 June 8
13.42	Dec. 10	10.33 Apr. 29
13.00	Mar. 13	9.50 Sept. 25
12.25	Aug. 8	6.75 Jan. 3
8.50	Jan. 12	6.43 July 5
11.33	Jan. 6	8.50 Dec. 29
15.00	Feb. 18	11.25 Dec. 9
17.58	Jan. 29	14.08 Dec. 3

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

J&L COLD FINISHED STEEL

FOR EASILY MACHINED • ACCURATE PARTS



**J&L
STEEL**

In addition to improved machinability and longer tool life obtained through use of J&L Cold Finished steel, many manufacturers specify this precision product for its improved surface finish. They also obtain in J&L cold drawn and cold rolled bars and special shapes the higher physical qualities needed for parts of modern high-speed machines. J&L engineers and metallurgists will be glad to assist you with your production problems. Write or phone your nearest J&L office.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH, PA.

Iron and Steel Prices . . .

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/32 in. to 47/64 in., 0.15¢ per lb higher.

Basing Points	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO		
													Detroit	New York	Phila- delphia
INGOTS															
Carbon, rerolling															
	(\$33.00 f. o. b. mill)														
Carbon, forging	\$38	\$38	\$38	\$38	\$38	\$38	\$38								
Alloy.....	\$48.69	\$48.69				\$48.69									
	(Bethlehem, Massillon, Canton, Coatesville=\$48.69)														
BILLETS, BLOOMS, SLABS															
Carbon, rerolling	\$39	\$39	\$39	\$39	\$39							\$51 ¹⁴	\$41		
	(Provo=\$50.20, Duluth=\$41 ¹⁴)														
Carbon, forging billets.....	\$47	\$47	\$47	\$47	\$47							\$59 ¹⁴	\$49		
	(Provo=\$58.20, Duluth=\$49 ¹⁴)														
Alloy	\$58.43	\$58.43				\$58.43							\$60.43		
	(Bethlehem, Massillon, Canton=\$58.43)														
SHEET BARS	\$38	\$38		\$38		\$38	\$38	\$38							
	(Canton=\$38)														
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢							
	(Coatesville=2.05¢)														
WIRE RODS ¹⁵															
No. 5 to 9/32 in.	2 30¢	2.30¢		2.30¢	2.30¢						2.55¢	2.80¢			
	(Worcester=2.40¢)														
SHEETS															
Hot-rolled	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.525¢	2.425¢		2.975¢	2.525¢	2.685¢	2.615¢
Cold-rolled ¹	3.275¢	3.275¢	3.275¢	3.275¢		3.275¢	3.275¢		3.375¢	3.275¢		3.925¢	3.375¢	3.615¢	3.635¢
Galvanized (24 gage)	4.05¢	4.05¢	4.05¢		4.05¢	4.05¢	4.05¢	4.05¢	4.15¢	4.05¢		4.60¢		4.31¢	4.24¢
Enameling (20 gage)	3.80¢	3.80¢	3.80¢	3.80¢			3.80¢		3.90¢	3.80¢		4.45¢	3.90¢	4.20¢	4.16¢
Enameling (10 Gage)	3.20¢	3.20¢	3.20¢	3.20¢			3.20¢		3.30¢	3.20¢		3.85¢	3.30¢	3.60¢	3.56¢
Long ternes ²	4.05¢	4.05¢	4.05¢									4.80¢		4.45¢	4.41¢
STRIP															
Hot-rolled ³ 6 in. and under over 6 in.	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢		2.45¢ 2.35¢			2.45¢ 2.35¢		3.10¢ 3.00¢	2.55¢ 2.45¢	2.85¢ 2.75¢	2.81¢ 2.71¢
Cold-rolled ⁴	3.05¢	3.15¢		3.05¢			3.05¢						3.15¢	3.45¢	3.41¢
	(Worcester=3.25¢)														
Cooperage stock	2.55¢	2.55¢			2.55¢		2.55¢							2.95¢	
TINPLATE															
Standard cokes, base box	\$5.00	\$5.00	\$5.00		\$5.10			\$5.10	\$5.10					\$5.375	\$5.301
Electro, box															
0.25 lb	\$4.35	\$4.35	\$4.35					\$4.35							
0.50 lb	\$4.50	\$4.50	\$4.50					\$4.60	\$4.60						
0.75 lb	\$4.65		\$4.65					\$4.75	\$4.75						
BLACKPLATE															
29 gage ⁵	3.30¢	3.30¢	3.30¢					3.40¢	3.40¢					3.66¢	3.59¢
TERNES, MFG.															
Special coated, base box	\$4.55	\$4.55	\$4.55					\$4.65	\$4.65						
BARs															
Carbon steel	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢					2.85¢	3.15¢	2.60¢	2.84¢
	(Duluth=2.60¢)														
Rail steel ⁶	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢						2.85¢	3.15¢		
Reinforcing (billet) ⁷	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢				2.70¢	2.75¢	2.45¢	2.61¢
Reinforcing (rail) ⁷	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢					2.70¢	2.75¢	2.45¢	
Cold-finished ⁸	3.10¢	3.10¢	3.10¢	3.10¢		3.10¢								3.44¢	3.46¢
	(Detroit=3.15¢) (Toledo=3.25¢)														
Alloy, hot-rolled	2.92¢	2.92¢				2.92¢	2.92¢							3.02¢	
	(Bethlehem, Massillon, Canton=2.92¢)														
Alloy, cold-drawn	3.62¢	3.62¢	3.62¢	3.62¢		3.62¢								3.73¢	
PLATE															
Carbon steel ¹³	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢					2.50¢	2.85¢	3.05¢	2.72¢
	(Coatesville and Claymont=2.50¢, Provo, Utah=3.20¢)														
Floor plates	3.75¢	3.75¢										4.10¢	4.40¢		
Alloy	3.79¢	3.79¢										4.27¢	4.49¢		
	(Coatesville=3.79¢)														
SHAPES															
Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢						2.60¢	3.00¢		
	(Bethlehem=2.35¢)														
SPRING STEEL, C-R															
0.26 to 0.50 carbon	2.80¢			2.80¢											
	(Worcester=3.20¢)														
0.51 to 0.75 carbon	4.30¢			4.30¢											
	(Worcester=4.50¢)														
0.76 to 1.00 carbon	6.15¢			6.15¢											
	(Worcester=6.35¢)														
1.01 to 1.25 carbon	8.35¢			8.35¢											
	(Worcester=8.55¢)														
WIRE ⁹															
Bright ¹²	3.05¢	3.05¢		3.05¢	3.05¢										
	(Worcester=3.15¢) (Duluth=3.10¢)														
Galvanized															
	Add proper size extra and galvanizing extra to Bright Wire Base														
Spring (high carbon)	4.00¢	4.00¢		4.00¢											
	(Worcester=4.10¢) (Trenton=4.25¢)														
PILING															
Steel sheet	2.65¢	2.65¢				2.65¢						3.20¢		2.99¢	3.01¢

PRICES

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT

	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 446
Ingot, P'gh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation		Subject to negotiation			
Blooms, P'gh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, P'gh, Chi, Canton, Balt, Phila, Reading.	22.99	24.67	17.01	17.47	20.69	25.29
Billets, P'gh, Chi, Canton, Newark, N. J., Watervliet, Syracuse, Balt.	Subject to negotiation		Subject to negotiation			
Billets, forging, P'gh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse, Newark, N. J., Ft. Wayne, Titusville.	22.99	24.67	17.01	17.47	20.69	25.29
Bars, h-r, P'gh, Chi, Canton, Dunkirk, Watervliet, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Titusville.	27.05	25.97	20.02	20.56	24.34	29.75
Bars, c-r, P'gh, Chi, Cleva, Canton, Dunkirk, Newark, N. J., Syracuse, Balt, Phila, Reading, Ft. Wayne, Watervliet.	27.05	25.97	20.02	20.56	24.34	29.75
Plates, P'gh, Middletown, Canton.	31.38	29.21	23.28	23.80	28.67	33.00
Shapes, structural, P'gh, Chi.	27.05	25.97	20.02	20.56	24.34	29.75
Sheets, P'gh, Chi, Middletown, Canton, Balt.	38.95	36.79	28.67	31.38	35.16	38.49
Strip, h-r, P'gh, Chi, Reading, Canton, Youngstown.	25.43	23.28	18.39	18.93	25.97	37.87
Strip, c-r, P'gh, Cleva, Newark, N. J., Reading, Canton, Youngstown.	32.46	30.30	23.80	24.34	34.82	56.26
Wire, c-d, Cleva, Dunkirk, Syracuse, Balt, Reading, Canton, P'gh, Newark, N. J., Phila.	27.05	25.97	20.02	20.56	24.34	29.75
Wire, flat, c-r, Cleva, Balt, Reading, Dunkirk, Canton.	32.46	30.30	23.80	24.34	34.82	56.26
Rod, h-r, Newark, N. J., Syracuse.	27.05	25.97	20.02	20.56	24.34	29.75
Tubing, seamless, P'gh, Chi, Canton, (4 in. to 6 in.)	72.09	72.09	.....	66.49	.....	.....

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57½¢
High-carbon-chromium*	43¢
Oil hardening*	34¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi as 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., net ton	\$43.39
Angle splice bars, 100 lb	2.85

(F.o.b. basing points) per net ton

Light rails (from billets)	\$49.18
Light rails (from rail steel)	49.18

base per lb

Cut spikes	3.65¢
Screw spikes	5.55¢
Tie plate, steel	2.55¢
Tie plates, Pacific Coast	2.70¢
Track bolts	*4.75¢
Track bolts, heat treated, to rail-roads	*5.00¢
Track bolts, jobbers discount	63-5

*Plus a 12-pct increase.

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

SHELL STEEL

per gross ton

3 in. to 12 in.	\$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic openhearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are \$2.00 higher; East Michigan, \$3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at \$13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of \$52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	21.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.72	.....
Inconel-clad		
10 pct, f.o.b. Coatesville	26.00	.....
Monel-clad		
10 pct, f.o.b. Coatesville	24.96	.....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	.....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
Standard wire nails	\$3.75	\$4.25
Coated nails	3.75	4.25
Cut nails, carloads	4.85	.....

	base per keg
Standard wire nails	\$3.75
Coated nails	3.75
Cut nails, carloads	4.85

	base per 100 lb
Annealed fence wire	\$3.50
Annealed galv. fence wire	3.85

	base column
Woven wire fence*	72
Fence posts, carloads	74
Single loop bale ties†	72
Galvanized barbed wire**	79
Twisted barbed wire	79

*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

††Add 50¢ a ton.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets)

	20x14 in.	20x28 in.
8-lb coating I.C.	\$8.50	\$17.00
15-lb coating I.C.	9.50	19.00
20-lb coating I.C.	10.00	20.00

ALLOY EXTRAS

Alloy Steel	Basic Openhearth		Electric Furnace	
	Bars and Bar-strip	Billets, Blooms and Slabs	Bars and Bar-strip	Billets, Blooms and Slabs
A 8600	0.703¢	\$14.066	\$1.244	\$24.886
A 8700	0.757	15.148	1.298	25.988
NE 9400	0.811	16.230	1.352	25.050
NE 9700	0.703	14.066	1.244	24.886
NE 9800	1.407	29.132	1.947	38.952
NE 9900	1.298	25.968	1.677	33.542

The extras shown are in addition to the base price of \$2.92 per 100 lb on finished products and \$58.43 per gross ton on semifinished steel, major basing points, as shown in table, opposite page, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. When acid openhearth is specified and acceptable, add to basic openhearth alloy differential 0.27¢ per lb for bars and bar-strip and \$5.41 per gross ton for billets, blooms and slabs. Alloy price increases are retroactive to Mar. 1.

PRICES

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills
(F.o.b. Pittsburgh only on wrought pipe)
base price—\$200.00 per net ton

Steel (butt weld)

	Black	Galv.
1/2-in.	60 1/2	48
3/4-in.	63 1/2	52
1-in. to 3-in.	65 1/2	54 1/2

Wrought Iron (butt weld)

1/2-in.	17 1/2	+4 1/2
3/4-in.	24 1/2	2 1/2
1-in. and 1 1/4-in.	28 1/2	9 1/2
1 1/2-in.	33	11 1/2
2-in.	32 1/2	11 1/2

Steel (lap weld)

2-in.	58	46 1/2
2 1/2-in. and 3-in.	61	49 1/2
3 1/2-in. to 6-in.	63	51 1/2

Wrought Iron (lap weld)

2-in.	24 1/2	4 1/2
2 1/2-in. to 3 1/2-in.	25 1/2	7 1/2
4-in.	28 1/2	11 1/2
4 1/2-in. to 8-in.	27	10 1/2

Steel (butt, extra strong, plain ends)

1/2-in.	58 1/2	47 1/2
3/4-in.	62 1/2	51 1/2
1-in. to 3-in.	64	54

Wrought Iron (same as above)

1/2-in.	18 1/2	+1 1/2
3/4-in.	25 1/2	4 1/2
1-in. to 2-in.	33	13

Steel (lap, extra strong, plain ends)

2-in.	56	45 1/2
2 1/2-in. and 3-in.	60	49 1/2
3 1/2-in. to 6-in.	63 1/2	53

Wrought Iron (same as above)

2-in.	28 1/2	8 1/2
2 1/2-in. to 4-in.	34	16 1/2
4 1/2-in. to 6-in.	32 1/2	14 1/2

On butt weld and lap weld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld.

BOILER TUBES

Seamless steel and lap weld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless Cold-Drawn	Hot-Rolled	Lap-Drawn
2 in. O.D. 13 B.W.G.	16.52	13.90	13.20
2 1/2 in. O.D. 12 B.W.G.	22.21	18.70	17.67
3 in. O.D. 12 B.W.G.	24.71	20.79	19.56
3 1/2 in. O.D. 11 B.W.G.	31.18	26.25	24.68
4 in. O.D. 10 B.W.G.	38.68	32.56	30.55

(Extras for less carload quantities)
40,000 lb or ft and over.....Base
30,000 lb or ft to 39,999 lb or ft.... 5 pct
20,000 lb or ft to 29,999 lb or ft.... 10 pct
10,000 lb or ft to 19,999 lb or ft.... 20 pct
5,000 lb or ft to 9,999 lb or ft.... 30 pct
2,000 lb or ft to 4,999 lb or ft.... 45 pct
Under 2,000 lb or ft.... 65 pct

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in., del'd Chicago.....	\$70.33
6-in. to 24-in., del'd New York.....	69.60
6-in. to 24-in., Birmingham.....	61.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle for all rail shipment; rail and water shipment less	84.40
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

An increase of 12 pct applies to all listings

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Base discount less case lots

	Percent Off List
1/2 in. & smaller x 6 in. & shorter.....	65 1/2
9/16 & 5/8 in. x 6 in. & shorter.....	63 1/2
3/4 to 1 in. x 6 in. & shorter.....	61
1 1/4 in. and larger, all lengths.....	59
All diameters over 6 in. long.....	59
Lag. all sizes	62
Flow bolts	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

1/2 in. and smaller	62
9/16 to 1 in. inclusive.....	59
1 1/4 to 1 1/2 in. inclusive.....	57
1 1/2 in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.

Semifin. Hexagon Nuts U.S.S. S.A.E.

Base discount less case lots

7/16 in. and smaller	64
1/2 in. and smaller.....	62
1/2 in. through 1 in.	60
9/16 in. through 1 in.	59
1 1/4 in. through 1 1/2 in.	57
1 1/2 in. and larger	56

In full keg lots, 10 pct additional discount

Stove Bolts

	Consumer
Packages, nuts loose	71 and 10
In packages	71
In bulk	80

On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.

Large Rivets

(1/2 in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75

Small Rivets

(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws

Percent Off List

	Consumer
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes.....	36
Fillister head cap, listed sizes.....	51
Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.	

FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

	Base price per short ton
Effective CaF ₂ Content:	
70% or more	\$33.00
65% but less than 70%.....	32.00
60% but less than 65%.....	31.00
Less than 60%	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer	\$5.45
Old range, non-bessemer	5.30
Mesaba, bessemer	5.20
Mesaba, non-bessemer	5.05
High phosphorus	5.05

Prices are for ore shipped on and after June 24, 1946, and for ore covered by adjustable pricing agreements authorized by Order No. 8, RMPR 113.

These prices do not reflect the recent ICC increase in freight rates.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh..19 1/4¢ to 21 1/4¢	
Copper, electrolytic, 100 and 375 mesh	23 1/2¢ to 27 1/2¢
Copper, reduced, 150 and 200 mesh	22 1/2¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe.....	11¢ to 16¢
Swedish sponge iron, 100 mesh, c.l.f. New York, carlots	8 1/2¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots.....	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots	63¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe.25¢ to 31¢	
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90¢ to \$1.75
Aluminum, 100, 200 mesh, carlots	25¢
Antimony, 100 mesh	30¢
Cadmium, 100 mesh	\$1.75
Chromium, 100 mesh and finer.....	\$1.25
Lead, 100, 200 & 300 mesh.13 1/4¢ to 16 1/4¢	
Manganese, minus 325 mesh and coarser	44¢ to 61¢
Nickel, 150 mesh	51 1/2¢
Silicon, minus 325 mesh and coarser	26¢ to 55¢
Solder powder, 100 mesh..8 1/2¢ plus metal	
Tin, 100 mesh	58 1/2¢
Tungsten metal powder, 98%-99%, any quantity, per lb.....	\$2.60
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb..	\$2.65
Under 100 lb.....	\$2.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	\$7.50
Connellsville, Pa., hand drawn.	8.00
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	8.50
Foundry, Byproduct	
Chicago, del'd	15.10
Chicago, f.o.b.	14.35
New England, del'd	16.04
Kearny, N. J., f.o.b.	14.40
Philadelphia, del'd	14.63
Buffalo, del'd	14.75
Portsmouth, Ohio, f.o.b.	12.85
Painesville, Ohio, f.o.b.	13.50
Erie, del'd	14.50
Cleveland, del'd	14.55
Cincinnati, del'd	14.60
St. Louis, del'd	15.10†
Birmingham, del'd	12.25

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of \$15.60 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

	Per 1000
Fire Clay Brick	
Super-duty brick, St. Louis.....	\$76.05
First quality, Pa., Md., Ky., Mo., Ill., Ohio	60.40
First quality, New Jersey	65.90
Sec. quality, Pa., Md., Ky., Mo., Ill.	54.80
Sec. quality, New Jersey	57.70
Sec. quality, Ohio	52.95
Ground fire clay, net ton, bulk....	3.95

Silica Brick

Pennsylvania and Birmingham....	\$60.40
Chicago District	69.30
Silica cement, net ton (Eastern)....	10.60

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	\$54.00

Magnesite Brick

Standard, Balt. and Chester	\$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks	\$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk	22.00
in sacks	26.00
Clinker (dead burned) dolomite, per ton East, \$9.30; Midwest, add 10¢; Mo. Valley, add 20¢.	

PRICES

WAREHOUSE PRICES

Delivered metropolitan areas, per 100 lb.

Cities	SHEETS			STRIP			Plates ¾ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot- Rolled (10 gage)	Cold- Rolled	Galvanized (24 gage)	Hot-Rolled		Cold- Rolled			Hot- Rolled, A-8617-20	Cold- Finished	Hot- Rolled, A-8742-50 Ann.	Cold- Drawn, A-8617-20	Cold- Drawn A-8742-50 Ann.	
				6 in. and Under	Over 6 in.									
••Philadelphia.....	\$3.743	\$5.097	\$5.218a	\$4.272	\$4.172	\$5.022	\$3.855	\$3.916	\$4.072	\$4.522	\$6.016	\$7.116	\$7.372	\$8.422
New York.....	3.815	4.838 ¹	5.46	4.324	4.224	5.024	4.018	4.008	4.103	4.553	6.058	7.158	7.403	8.453
Boston.....	3.999	4.969 ³	5.674	4.456	4.356	4.965	4.162	4.162	4.294	4.594	6.212	7.312	7.444	8.494
Baltimore.....	3.619	5.077	5.344	4.252	4.152	.....	3.844	4.009	4.052	4.502	6.109	7.209	7.352	8.402
Norfolk.....	3.996	.....	5.821	4.515	4.415	.....	4.221	4.252	4.315	4.615	.....	.....	.....	.....
Chicago.....	3.475	4.425	5.581	3.95	3.85	4.90*	3.80	3.80	3.75	4.20	5.80	6.90	.....	8.00
Milwaukee.....	3.612	4.562 ¹	5.537	4.087	4.077	5.037*	3.937	3.937	3.887	4.337	6.037	7.037	7.187	8.237
Cleveland.....	3.575	4.625	5.327	3.95	3.85	4.70*	3.85	3.838	3.80	4.20	6.006	7.106	6.95	8.00
Buffalo.....	3.575	4.625	5.20	4.169	4.069	4.919*	3.88	3.85	3.80	4.20	5.80	6.90	6.95	8.00
Detroit.....	3.675	4.725	5.45	4.05	3.95	.....	3.859	3.911	3.70	4.25	6.13	7.23	7.259	8.309
Cincinnati.....	3.65	4.70 ¹	5.275	4.025	3.925	4.961	3.911	3.941	3.861	4.461	6.15	7.25	7.311	8.361
St. Louis.....	3.622	4.572 ¹	5.581	4.097	3.997	5.181*	3.947	3.947	3.897	4.481	6.181	.....	7.331	.....
Pittsburgh.....	3.575	4.625	5.20	3.95	3.85	4.70	3.85	3.85	3.80	4.20	5.80	6.90	6.95	7.95
St. Paul.....	3.797	4.747	5.635	4.272	4.172	5.352	4.122	4.122	4.072	4.811	6.202	6.302	7.352	7.402
Omaha.....	4.015	5.72	6.00	4.52	4.42	.....	4.37	4.37	4.32	4.945	.....	.....	.....	.....
Indianapolis.....	3.745	4.795	5.37	4.12	4.02	4.99	3.88	3.88	3.83	4.43	6.13	.....	7.28	.....
Birmingham.....	3.675	.....	5.20	4.05	3.95	.....	3.80	3.80	3.75	4.903	.....	.....	.....	.....
Memphis.....	4.19	4.885	5.715	4.565	4.465	.....	4.315	4.315	4.265	4.78	.....	.....	.....	.....
New Orleans.....	4.283*	5.304	5.808	4.668	4.568	.....	4.408	4.408*	4.358*	5.079	.....	.....	.....	.....
Houston.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Los Angeles.....	4.85	6.60 ¹	6.55	5.30	5.20	.....	4.80	4.70	4.65	6.03	.....	.....	.....	.....
San Francisco.....	4.12	5.87	6.35	4.60	4.50	4.15	4.15	4.15	4.30	5.78	.....	.....	.....	.....
Seattle.....	4.67 ²	7.27 ²	6.40	4.60	4.50	.....	5.00 ⁵	4.70 ⁵	4.60 ⁵	6.23	.....	.....	.....	.....
Portland.....	4.67 ⁴	6.82 ⁴	6.20	5.10	5.00	.....	5.06 ⁴	4.70 ⁴	4.70 ⁴	5.98	8.15	.....	9.20	.....
Salt Lake City.....	4.75	.....	6.62 ⁷	5.88	5.78	.....	5.23 ⁷	5.23 ⁷	5.13	6.35	.....	.....	.....	.....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars, 1500 lb base.

NE ALLOY BARS: 1000 to 39,999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 450 to 3749 lb; (4) 300 to 4999 lb; (5) 300 to 10,000 lb; (6) 2000 lb and over; (7) 3500 lb and over.

(*) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

* Add 0.271¢ for sizes not rolled in Birmingham.

** City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Per gross ton, retroactive to May 29.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem.....	29.00	29.50	30.00	30.50	.....	Boston.....	Everett.....	\$0.50 Arb.	29.50	30.00	30.50	31.00	.....
Birdsboro.....	29.00	29.50	30.00	30.50	34.00	Boston.....	Birdsboro-Steeltown...	4.47	.....	.....	.....	.....	38.47
Birmingham.....	23.50*	24.88*	.....	29.50	.....	Brooklyn.....	Bethlehem.....	2.78	31.78	32.28	32.78	33.28	.....
Buffalo.....	27.50	28.50	29.00	29.50	34.00	Brooklyn.....	Birdsboro.....	3.26	.....	.....	.....	.....	37.26
Chicago.....	28.00	28.50	28.50	29.00	.....	Canton.....	Clev. Ygstin, Sharpsvil.	1.54	29.54	30.04	30.04	30.54	.....
Cleveland.....	28.00	28.50	28.50	29.00	.....	Canton.....	Buffalo.....	3.55	.....	.....	.....	.....	37.55
Detroit.....	28.00	28.50	28.50	29.00	.....	Cincinnati.....	Birmingham.....	4.30	27.80*	29.18*	.....	.....	.....
Duluth.....	28.50	29.00	29.00	29.50	.....	Cincinnati.....	Hamilton.....	1.24	.....	29.74	.....	.....	.....
Erie.....	28.00	28.50	29.00	29.50	.....	Cincinnati.....	Buffalo.....	4.89	.....	.....	.....	.....	38.89
Everett.....	29.00	29.50	30.00	30.50	.....	Jersey City.....	Bethlehem.....	1.70	30.70	31.20	31.70	32.20	.....
Granite City.....	28.00	28.50	28.50	29.00	.....	Jersey City.....	Birdsboro.....	2.16	.....	.....	.....	.....	36.16
Hamilton.....	28.00	28.50	28.50	29.00	.....	Los Angeles.....	Provo.....	5.25	31.25	31.75	.....	.....	.....
Neville Island.....	28.00	28.50	28.50	29.00	.....	Los Angeles.....	Buffalo.....	16.33	.....	.....	.....	.....	50.33
Provo.....	28.00	26.50	.....	.....	.....	Mansfield.....	Cleveland-Toledo.....	2.16	30.16	30.66	30.66	31.16	.....
Sharpsville.....	28.00	28.50	28.50	29.00	.....	Mansfield.....	Buffalo.....	3.74	.....	.....	.....	.....	37.74
Sparrows Point.....	29.00	29.50	.....	.....	.....	Philadelphia.....	Swedeland.....	0.93	29.93	30.43	30.93	31.43	.....
Steeltown.....	29.00	.....	.....	.....	34.00	Philadelphia.....	Birdsboro.....	1.38	.....	.....	.....	.....	35.38
Swedeland.....	29.00	29.50	30.00	30.50	.....	San Francisco.....	Provo.....	5.25	31.25	31.75	.....	.....	.....
Toledo.....	28.00	28.50	28.50	29.00	.....	San Francisco.....	Buffalo.....	16.33	.....	.....	.....	.....	50.33
Youngstown ¹	28.00	28.50	28.50	29.00	.....	Seattle.....	Provo.....	5.25	31.25	31.75	.....	.....	.....
						Seattle.....	Buffalo.....	16.33	.....	.....	.....	.....	50.33
						St. Louis.....	Granite City.....	0.50 Arb.	28.50	29.00	29.00	29.50	.....
						St. Louis.....	Buffalo.....	7.86	.....	.....	.....	.....	41.86

* Republic Steel Corp. has been granted a \$2 increase on basic and foundry pig iron produced at Birmingham.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, \$33.00 and \$34.00, respectively. Newberry Brand of Lake Superior charcoal iron \$39.00 per g.t., f.o.b. furnace. Delivered to Chicago, \$42.34.

High phosphorus iron sells at Lyles, Tenn., at \$28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each

0.50 pct manganese content in excess of 1.00 pct. \$2 per ton extra may be charged for 0.5 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—\$34.00; f.o.b. Buffalo—\$35.25. Add \$1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add \$1.00 per ton for prices of comparable analysis.

FERROALLOY PRICES

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	\$135.00
Less ton lots (packed)	148.50
F.o.b. Pittsburgh	139.50
\$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.	
Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.	
Carload, bulk	6.05
Ton lots	6.65
Less ton lots	6.80

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.

16-19% Mn	19-21% Mn
3% max. Si	3% max. Si
Carloads	\$35.00
Less ton lots	47.50
F.o.b. Pittsburgh, Chicago	40.00

Manganese Metal

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.

96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.	
Carload, bulk	30
L.c.l. lots	32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	32
Ton lots	34
Less ton lots	36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.

0.10% max. C, 0.06% P, 90% Mn	21.00	21.40	21.65
0.10% max. C	20.50	20.90	21.15
0.15% max. C	20.00	20.40	20.65
0.30% max. C	19.50	19.90	20.15
0.50% max. C	19.00	19.40	19.65
0.75% max. C			
7.00% max. Si	16.00	16.40	16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05
Ton lots	6.70
Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet.	5.80
Ton lots	6.30
Less ton lots	6.55

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, \$51.25 f.o.b. Keokuk, Iowa; \$48.00 f.o.b. Jackson, Ohio; \$49.25 f.o.b. Niagara Falls. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.

96% Si, 2% Fe.	13.10	13.55	16.50
97% Si, 1% Fe.	13.45	13.90	16.80

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si.

Carload, bulk	3.60	3.75	3.90
Ton lots	4.05	4.55	4.60
Less ton lots	4.45	4.80	4.85

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.

50% Si	7.05	7.50	7.65
75% Si	8.55	8.70	9.25
80-90% Si	9.50	9.65	10.15
90-95% Si	11.80	11.95	12.40

Ferrochrome

(65-72% Cr, 2% max. Si) Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.

0.06% C	23.00	23.40	24.00
0.10% C	22.50	22.90	23.50
0.15% C	22.00	22.40	23.00
0.20% C	21.50	21.90	22.50
0.50% C	21.00	21.40	22.00
1.00% C	20.50	20.90	21.50
2.00% C	19.50	19.90	20.50
66-71% Cr, 4-10% C	14.50	14.90	15.00
62-66% Cr, 5-7% C	15.05	15.45	15.55
Briquets—contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.			
Carload, bulk	9.20	9.50	9.90
Ton lots	9.80	10.30	11.80
Less ton lots	10.10	10.60	12.10

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66.71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.	
Carload	15.60
Ton lots	16.65
Less ton lots	17.30
Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.	
Carload	20.00
Ton lots	21.00
Less ton lots	22.00

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.

0.20% max. C	83.50	85.00	86.25
0.50% max. C	79.50	81.00	82.25
9.00% min. C	79.50	81.00	82.25

Chromium-Copper

Contract price, cents per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si.

Calcium-Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.

30-35% Ca, 60-65% Si, 3.00% max. Fe	
or 28-32% Ca, 60-65% Si, 6.00% max. Fe.	
Carloads	13.00
Ton lots	14.50
Less ton lots	15.50

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.

16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads	15.50
Ton lots	16.50
Less ton lots	17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1¢ for central zone; 5¢ for western zone.

Ton lots	\$1.35	Turnings	\$1.75	Distilled	\$4.25
Less ton lots	1.60		2.00		5.00

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.	
Ton lots	12.00
Less ton lots	12.50
Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.	
Ton lots	11.75
Less ton lots	12.25

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.

60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe.	
Ton lots	12.00
Less ton lots	12.50

Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed.

Ferrovandium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V.	\$1.88
Openhearth	\$2.70
Crucible	\$2.80
High speed steel (Primos)	\$2.90
Vanadium pentoxide, 88-92% V ₂ O ₅ technical grade, contract basis, per pound contained V ₂ O ₅ .	\$1.10
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb.	\$2.25
Ton lots	\$2.30
Less ton lots	
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	95¢
Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo	80¢
Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo	80¢
Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo	80¢
Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti	\$1.23
Less ton lots	\$1.25
Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti	\$1.35
Less ton lots	\$1.40
High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads	\$142.50
Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalized with Rockdale, Tenn., per gross ton	\$58.50
Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton	\$75.00
Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.	14¢
Carload lots	
Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy	4.60¢
Carload, bulk	
Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload	5.75¢
Ton lots	7.25¢
Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound	8.00¢
Car lots	8.75¢
Ton lots	9.25¢
Less ton lots	

Boron Agents

Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.

Ferroboreon, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.	
Less ton lots	\$1.30
Eastern Central Western	\$1.3075 \$1.329

Manganese-Boron 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

Ton lots	\$1.89	\$1.903	\$1.935
Less ton lots	2.01	2.023	2.055

Nickel-Boron 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

Less ton lots	\$2.10	\$2.1125	\$2.1445
Silicaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.			
Carload lots	25¢		
Ton lots	26¢		

Silvaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy.

Carload lots	58¢
Ton lots	59¢

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over.

No. 1	87.5¢
No. 6	60¢
No. 79	45¢
Bortram, f.o.b. Niagara Falls	
Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Find Aluminum Dross, Waste Product, to Be Source of Aluminum

Washington

• • • Rough cost estimates on the most successful recovery processes for aluminum metal and alumina from industrial wastes such as aluminum dross indicate that raw dross might be beneficiated mechanically, the separated metallics melted, and aluminum ingot cast at a gross profit of approximately \$28 per ton of dross. Similar cost estimates indicate that a ton of partly demetallized aluminum dross may be treated by a modified Bayer caustic-extraction process at a net profit of at least \$22 per short ton. The latter estimate does not include the possible profit that might be realized by sale of the abrasive-grade corundum residue.

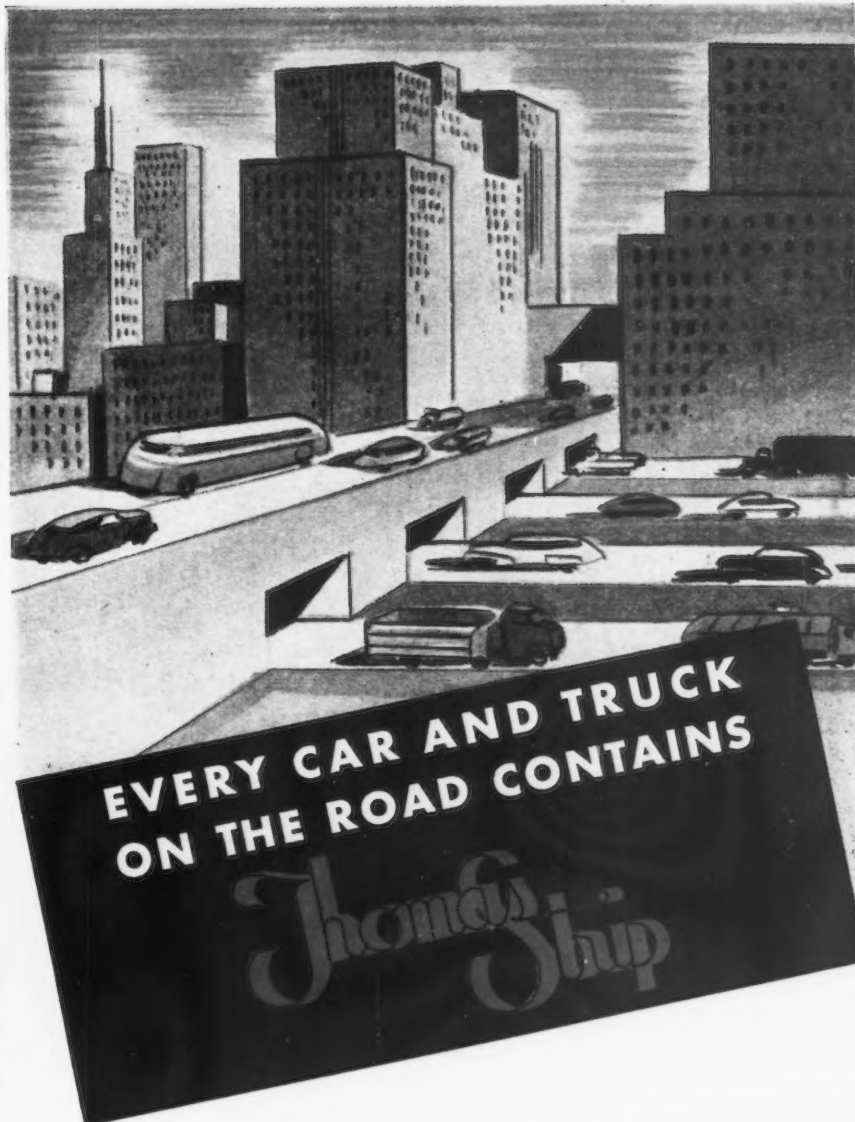
This investigation by the Bureau of Mines, an extension of an integrated program for producing cell-grade alumina from low- and marginal-grade domestic ores, was undertaken at a time when aluminum demands were increasing and enemy action was imperiling imports of foreign bauxite, the major source of domestic aluminum.

Statistical information collected by the Bureau showed that American aluminum plants were discarding each month some 2900 tons of aluminum dross containing about 9 pct metallic aluminum and the remainder was largely aluminum oxide. As the dross was a potentially far richer source of aluminum than any known naturally occurring ores, it was obvious that recovery of the metallic aluminum and the regeneration of alumina from the nonmetallic portion of the dross would add appreciably to the country's aluminum supply and substitute for ore reserves.

The Bureau undertook the work now reported, including mechanical beneficiation of aluminum dross, the segregation of metallic aluminum particles from the dross by ore dressing methods, the recovery of metal by melting, and the chemical treatment of partly demetallized aluminum dross for the recovery of alumina, ammonia, methane, and possibly abrasive-grade corundum.

Numerous methods of treatment were tried and the results are pre-

(CONTINUED ON PAGE 132)

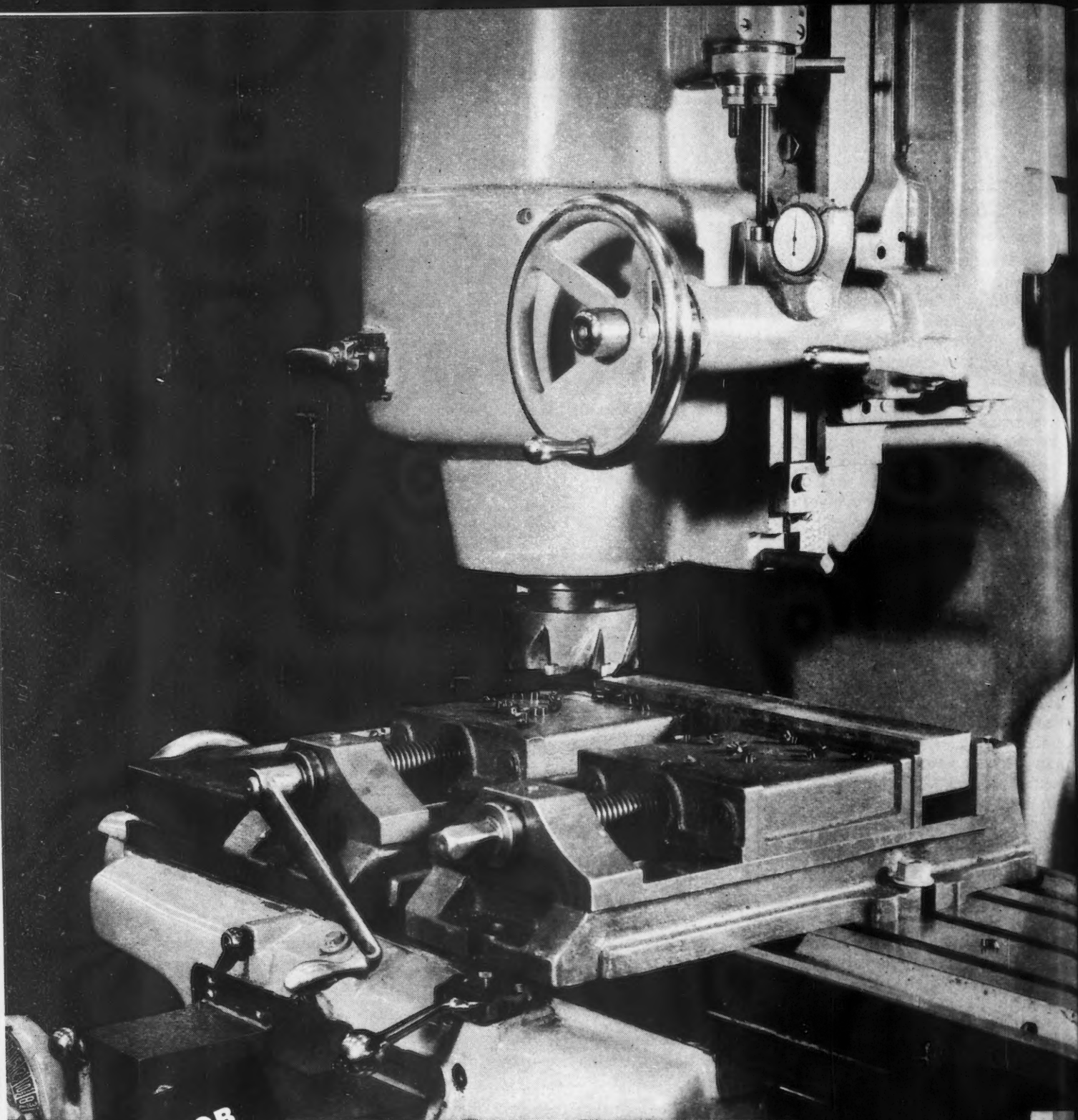


Why? The range of properties and finishes available in Thomas cold rolled strip provides many functional and decorative qualities for products in most all industries. As an example, in the automotive field you will find ThomaStrip in tubing, electrical instruments, trim, bearings, and many other parts. The use is so extensive that regardless of the make car you drive you can be certain it contains ThomaStrip in one or many places. Use Thomas experience in planning your new product . . . we will gladly share our experience with you.

Choice: ThomaStrip is available in electro-coated zinc, copper, nickel and brass . . . hot dipped tin and solder . . . lacquer coated in colors . . . uncoated precision strip, carbon and alloy specialties.

THE THOMAS STEEL COMPANY • WARREN, OHIO





THE JOB

Here are the facts of this job taken from the operation and performance sheets. The machining time per piece with the old method was 15.7 minutes. Compare this with the performance shown below:

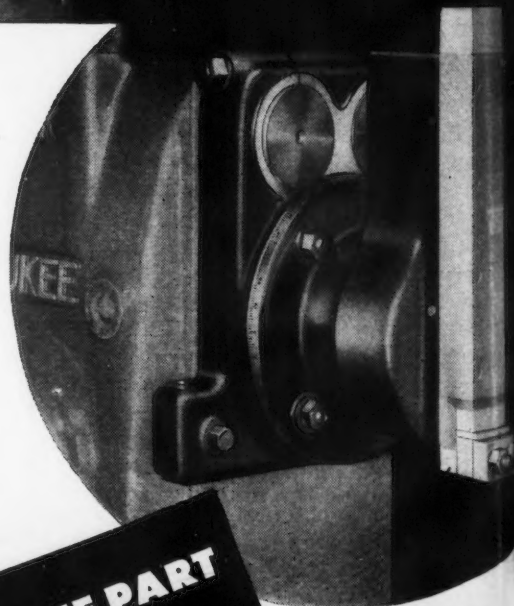
OPERATION:	Face mill four sides
WORKPIECE:	Slotting attachment ram
MATERIAL:	S. A. E. 4615 forging. $2\frac{1}{4}" \times 2\frac{3}{4}" \times 18\frac{1}{2}"$
MACHINE:	50 CSM Vertical
CUTTER:	6" dia., 8 Tooth CSM Carbide Face Mill with 7° negative primary rake angle — .020" wide
CUTTER SPEED:	275 rpm
TABLE FEED:	25 ipm
DEPTH OF CUT:	$\frac{1}{4}"$

MACHINING TIME: 3.8 minutes

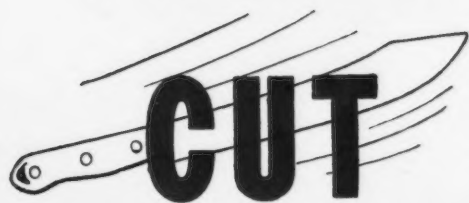
Total saving in actual machining time: 11.9 minutes or 75.8%

The part machined in this job is the operating ram used in a slotting attachment for Kearney & Trecker Milling Machines. It must be tough and accurate. It is milled to a semi-finish state on the CSM and finish ground to final accuracy.

THE PART



MILLING TIME



75%



CSM's . . .
THE MOST
POWERFUL MILLING
MACHINES OF
THEIR TYPE.

**4615 Alloy Steel Forging
Milled in 3.8 Minutes on
New Kearney & Trecker
50 CSM Milling Machine.
Former Time 15.7 Minutes**

Here is one of those every-day, "run-of-the-mill," small-lot jobs done as fast and as practically as common-sense modern shop methods and equipment say it should be — namely, on a Kearney & Trecker CSM Milling Machine with a carbide cutter used to full efficiency.

CSM Milling Machines were designed to obtain the greatest benefits from modern cutting tools, and are now part of our line of standard models. The design has been developed after a complete analysis of industry's problems of milling with carbide cutters.

Because they are knee type machines, they are readily adaptable to a great variety of work. They are precision built in accordance with long established Kearney & Trecker standards, and will cut metals faster and to finer tolerances and superior finishes than ever before, with high speed steel cutters as well as carbide cutters.

CSM machines are available in 20, 30 or 50 hp models in both plain and vertical knee types.



Write for complete data on CSM machines — *CATALOG CSM-20*. Please indicate your business connection.

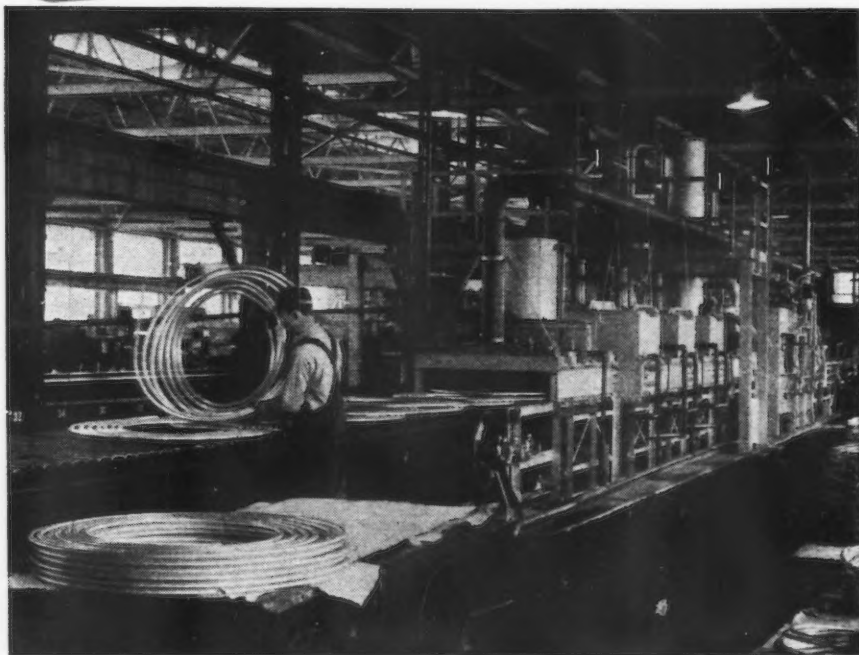
**KEARNEY & TRECKER
CORPORATION**

MILWAUKEE 14, WISCONSIN



**BE READY FOR TOMORROW
... WITH CSM's**

"PENOLA PRESCRIPTIONS"



THE PROBLEM... A plant was hampered by the occasional stoppage of a roller-bearing conveyor. This conveyor passes through a temperature zone just below 600° F. A light oil was used for lubrication and the extreme heat caused the conveyor bearings to become carbonized.

THE DIAGNOSIS... A Penola Industrial Engineer was called in to remedy this. He noted the formation of carbon on the bearings which indicated the need for a lubricant that would leave no carbon or gummy residue when vaporized, and lubricate the bearings in the hot zone.

THE PRESCRIPTION...

Rx Van Caloria 50

applied by an automatic lubricator just before the conveyor first comes in contact with the heat. The Van Caloria is a special high temperature lubricant containing a small amount of colloidal graphite. The oil left no residue and the graphite was present to protect the bearings until more Van Caloria was applied... and for over a year since the application, there have been no shutdowns—another Penola solution representing a saving of time, money and materials!

PENOLA LUBRICANTS

CHICAGO, ILLINOIS • NEW YORK • DETROIT • ST. LOUIS



PENOLA PRODUCTS HAVE MEANT EXTRA PROTECTION SINCE 1885

132—THE IRON AGE, August 8, 1946

NEWS OF INDUSTRY

(CONTINUED FROM PAGE 129)

sented in the report, which was prepared by O. C. Garst, engineer-in-charge of the Bureau's waste metals projects, F. Frass and W. M. Mahan, metallurgists, and D. D. Blue and L. Fink, chemists, all then stationed at the Bureau's Eastern Experiment Station, College Park, Md.

A copy of the publication, Report of Investigation 3874, "The Recovery of Metal and Other Valuable Products from Aluminum Dross," may be obtained free from the Bureau of Mines, Dept. of the Interior, Washington 25.

Westinghouse Sends Nine To Nuclear Institute

Pittsburgh

• • • Nine engineers of the Westinghouse Electric Corp., including five from the staff of the Westinghouse Research Laboratories, will go to Oak Ridge, Tenn., to join the pool of scientific manpower which will work on peacetime applications of atomic power, it was announced recently.

The engineers will carry on research at an Institute of Nuclear Studies which is being established as a "super-university of the atomic age" to provide channels for cooperative research between government, universities and the industrial concerns which have been involved in the atomic energy project at Oak Ridge.

On 1-yr loan for this important work from the Westinghouse Research Laboratories are Dr. Elmer B. Ashcraft of the chemical and metallurgical dept.; Dr. Sidney Siegel of the magnetic dept.; Dr. R. C. Mason of the electrophysics dept.; Dr. Jerald E. Hill and Dr. L. P. Hunter of the electronics dept.

The other Westinghouse engineers sent to Oak Ridge include two from the E. Pittsburgh works and two from the S. Philadelphia works. From E. Pittsburgh are J. W. Simpson of the switchgear engineering dept., and A. H. Toepfer of the district engineering and service dept. From S. Philadelphia are N. J. Paladino and E. F. Miller of the Steam Turbine Div.

Sponsored by a group of southeastern universities, the Institute of Nuclear Studies will carry out research in the fields of physics,

(CONTINUED ON PAGE 136)

DEVILBISS has the solution to Every Exhaust Problem in Industrial Finishing Rooms

MORE than 36 years of experience in building equipment to solve every exhaust problem in industrial finishing rooms has resulted in a broad and diversified line of perfected Devilbiss spray booths. Each is specifically designed for efficient performance in a particular type of work—all of them are constructed for minimum maintenance, easy cleaning and a high percentage of material reclamation.

Devilbiss Exhaust Systems are available in a great variety of types, including dry and water wash—overhead and down-draft exhaust—bench, leg, floor and tunnel types—table and canopy models. They enable all other equipment in your finishing department to operate at peak efficiency. Whether it's a standard stock booth or a specially engineered job for your particular requirements, each Devilbiss installation is planned in the interest of efficient, economical production and simplified low cost operation.

In addition, Devilbiss Spray Booths improve product quality and will assist your plant in quickly attaining maximum production. Before you select any finishing equipment be sure to get all the facts about the latest Devilbiss Spray Booths.

THE DEVILBISS COMPANY, TOLEDO 1, OHIO

Canadian Plant: Windsor Ontario

DEVILBISS

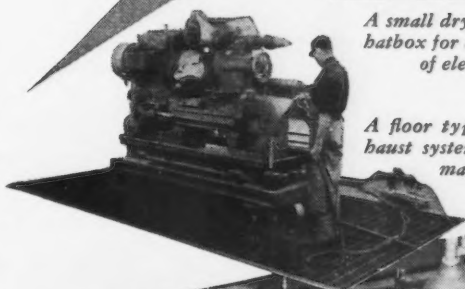


means Quality in all four..

SPRAY EQUIPMENT
EXHAUST SYSTEMS
AIR COMPRESSORS
HOSE & CONNECTIONS



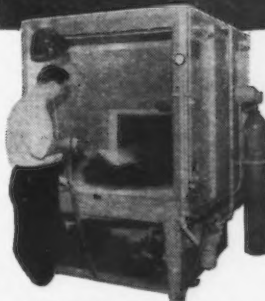
A small dry booth the size of a bathtub for coating the cathodes of electronic tubes.



A floor type down-draft exhaust system used in finishing machine tools.



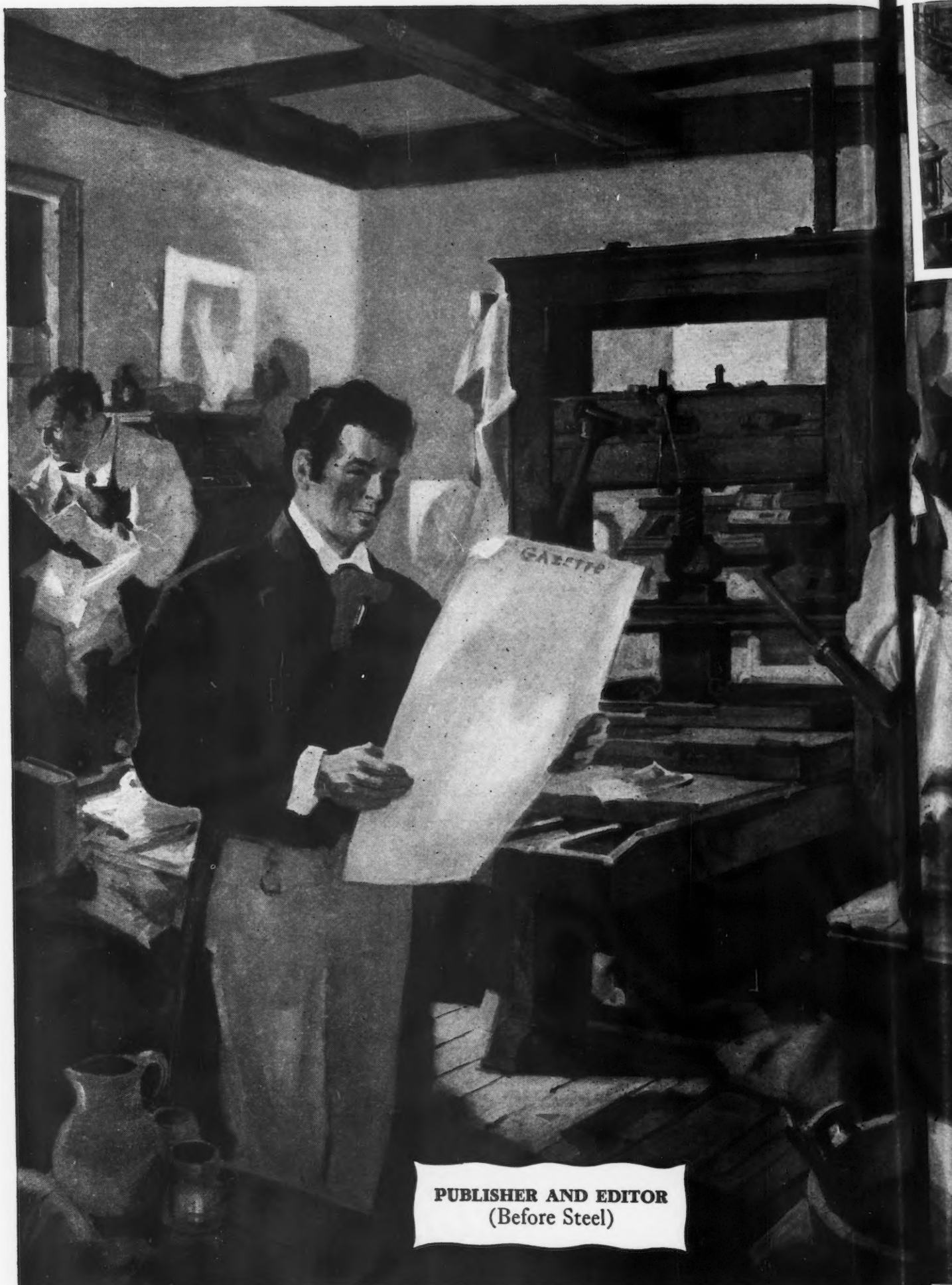
A Devilbiss Water wash spray booth used in painting axles.



A Devilbiss cleaning booth with filter packs used in degreasing engine parts.



A Devilbiss Down-draft Table effectively exhausts sanding dust.



PUBLISHER AND EDITOR
(Before Steel)

PAINTED FOR JONES & LAUGHLIN STEEL CORPORATION BY ORISON MACPHERSON

NEWS & PIX

One million daily circulation for a newspaper is easily served by the modern, high-speed, steel-constructed rotary presses that cost as much as a million dollars (see small sketch). They pour out streams of copies of your favorite paper containing news and pictures received by wire and radio up to the last minute before edition time. Presses are made up in units that weigh 8 to 10 tons each and print from stereotyped plates. Make-over for late editions can be done in a few minutes.

First American newspaper, printed on a sheet $7\frac{1}{2} \times 11$ inches, appeared April 24, 1704, was called The Boston News Letter. Three copies have been preserved.

News pictures come half around the world in minutes (sent and received by radio and wirephoto equipment) to illustrate next edition of your newspaper.

Typesetting by machinery in newspaper and publishing plants has been substituted for the slow, laborious practice of setting type by hand. The workability and durability of steel made possible the perfection of time-saving machines that not only set type, but also cast it brand new each time.

More color in daily papers for pictures and ads that will put week-day issues on a color parity with Sunday supplements and magazines, is being provided by improved, high-speed steel presses.

Venetians (1536) paid 1 gazetta to read manuscript paper circulated monthly reporting progress of a war, and eventually gave name of coin to newspaper itself.

Around the world every 7 days with passengers, pictures, mail, express is the regular schedule now operated by Air Transport Command, a forerunner of what civilian airlines will soon be doing. Nine-hour hops between East and West Coast are regular schedule with several airlines.

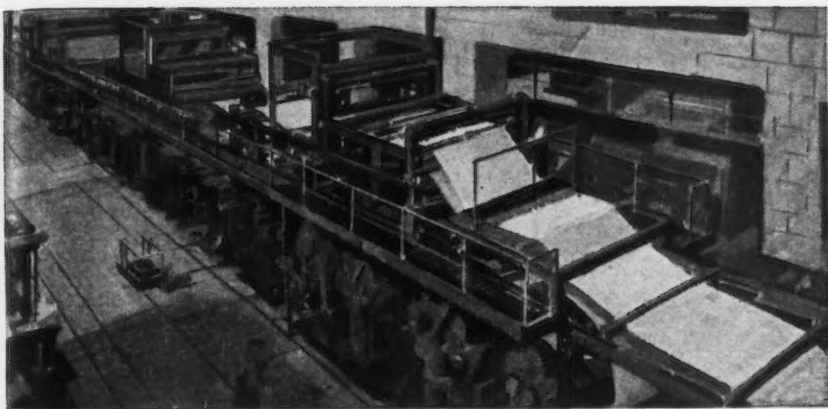
Armor for ocean cables consists of heavy, galvanized steel wire wound helically around the copper cable to protect it from deep sea or inshore damage.

"A new cable—called coaxial," states a newspaper advertisement of the Bell Telephone Company of Pa., "already shoulders an unheard of number of conversations simultaneously, and will play a stellar role in bringing television into your home."

Typewriter replaced pencil in editorial rooms, increased speed and accuracy in turning out "copy." But for steel, and especially the precision of parts possible with cold finished steels, there would have been no "writing machine."

Free reproduction in full color of Orison MacPherson's painting at left is available. Designed especially for framing, the painting is lithographed on fine, heavy paper, 14 x 17 inches. Write Publicity Manager, Jones & Laughlin Steel Corporation, Pittsburgh 30, Pa.

COPYRIGHT 1946, JONES & LAUGHLIN STEEL CORPORATION



YOU WOULD HAVE LITTLE NEWS, LONG DELAYED —WITHOUT STEEL

Without steel, you would get news by sailing packets, stage coaches and steam cars. It would be days, even weeks, old. You would read it in small newspapers printed crudely on slow little presses.

Today, with the assistance of a great variety of steel products, news and pictures are brought to you from all over the world in minutes—like magic. Steel wire enables them to be transmitted almost instantly by telegraph and telephone. Steel goes into equipment that brings them to you by radio, television and motion pictures. Fast rotary steel presses produce them in newspapers and magazines.

The swift collection and distribution of news and pictures would be impossible without steel—the universal metal of great strength and endurance, high resistance to wear and weather. For the high-speed work it must do, the communications industry requires steel products of the highest character, such as are produced under rigid quality control by Jones & Laughlin Steel Corporation. These include J&L steel wire, hot and cold rolled sheets and strip, cold finished bars and special shapes, seamless and Electricweld steel pipe, tin mill products and such special J&L products as Jalcase, a forging steel, Otiscoloy, a high tensile steel, and Jallooy, a tough, hard, strong steel for dynamic jobs.

**JONES & LAUGHLIN
STEEL CORPORATION**

PITTSBURGH, PENNSYLVANIA



LIGHTER, STRONGER, CONTROLLED QUALITY STEELS

NO OTHER FLOOR PLATE
MAKES STAIR TREADS SO **SAFE**
YET SO EASY TO CLEAN



Slippery stair treads cause many serious falling accidents, and management pays the bills when workers are injured or when accidents interfere with production. Guard your workers against slipping and falling and increase your operating efficiency by installing AW Super-Diamond Floor Plates throughout your plant. The exclusive Super-Diamond Pattern provides maximum skid resistance and gives men's feet a firm steady grip.

The engineered design has no corners to collect dirt. Water drains and dries quickly and it is easy to clean with hose, brush or mop. The readily matched pattern makes overnight installations practical, with minimum cutting waste. Join the throng of architects, builders, product engineers and the purchasing agents who insist on AW Super-Diamond Floor Plates for safety and economy.

Free—A 16 page booklet L-27 giving helpful information on weight per square foot, and maximum sizes. Alan Wood Steel Company, Conshohocken, Penna.

AW SUPER-DIAMOND

FLOOR PLATES THAT GRIP

A Product of

ALAN WOOD STEEL COMPANY

Other Products: Billets • Plates • Sheets • Carbon & Alloy



NEWS OF INDUSTRY

(CONTINUED FROM PAGE 132)

chemistry, biology, medicine, and engineering.

In conjunction with these studies at Oak Ridge, the Westinghouse Research Laboratories have launched a broad program of research into nuclear physics and the problems associated with the conversion of atomic energy into a useful source of power. Part of the program involves modernization of the 65-ft high atom smasher which blasts the heart of matter by building up an "electrical pressure" of 4,000,000 v to shoot sub-atomic particles at speeds as high as 100,000,000 mph.

GE Revamps Special Products Division

Schenectady, N. Y.

•••Reorganization and expansion of the General Electric apparatus department's special products division, calling for establishment of four separate sections and a marketing and promotion group, has been announced by Warren C. Hutchins, manager of the division.

Under the expansion, a laboratory products section will be responsible for sale of products ranging from the huge million volt betatron to the 4 oz viscosimeter. The section's primary concern will be pioneering sale of apparatus developed by the company's laboratories.

Other sections created are: a power rectifier section, responsible for electronic equipment to deliver direct-current power for electrolytic processes, mines and railways; a process instrumentation section, responsible for sale of equipments for measurement and control of a process; and an educational section, responsible for sale of all apparatus department products to educational institutions.

Sale of permanent magnets, including Alnico and several other new permanent magnets introduced by GE and pioneered by the special products division, has been transferred to the chemical department.

New section heads appointed are: Harrison Johnston, IV, laboratory products section; S. Martin, Jr., power rectifier section; C. W. Bowman, power rectifier section; and D. Lee Chesnut, educational section. C. W. Merritt was named to take charge of the promotional activities group.

Contact **KAYDON** of Muskegon

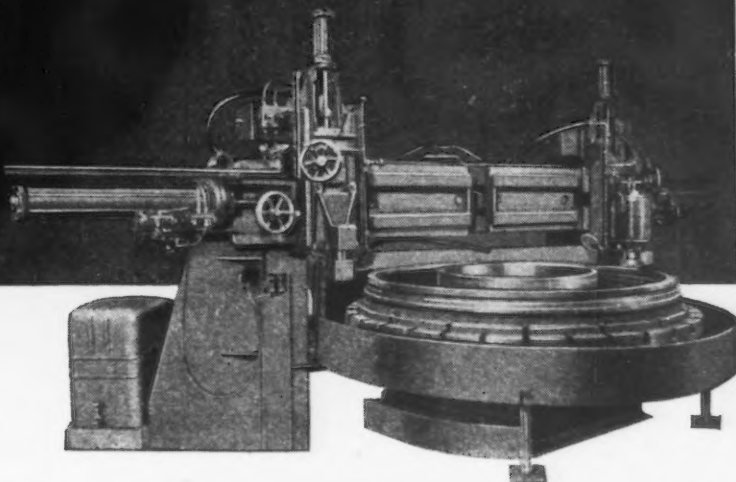
FOR ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER



KAYDON Double Row Taper Roller Bearing, 34.000" x 42.250" x 7.375", permits smooth, precision operation of the table spindle on the big 120" capacity double-head, heavy-duty super precision grinder shown at right.

BIG PRECISION GRINDER

...calls for Big Precision Bearings
... and KAYDON answers "O. K."



THIS double head grinder permitted production of super precision accuracy in Naval gun mounts. It was designed to produce work of an angular accuracy of less than one-half thousandth (.0005") in 72", in flatness, squareness, concentricity, roundness and taper, and permitted interchangeability of gun mount parts which formerly were tediously hand scraped. Parts produced in regular production to an accuracy of .0002".

We believe this to be the world's largest, super precision industrial grinder, 26 of which were manufactured.

In heavy oil field machinery, ponderous steel-mill equipment, complicated paper-mill units... in rugged

road-building machines, excavators, hoists, crushers... powerful bending machines, production units, and other industrial equipment... KAYDON bearings are improving performance and lengthening service-life. Look to KAYDON, Standard or Special, for the better bearing service your equipment deserves.

* * * *

Counsel in confidence with KAYDON. Capacity now available for all sizes and types of KAYDON bearings... and for atmospheric controlled heat treating, precision heat treating, salt-bath and sub-zero conditioning and treatment, microscopy, physical testing and metallurgical laboratory services.

THE KAYDON ENGINEERING CORP.

MUSKEGON • MICHIGAN

KAYDON Types of Standard or Special Bearings:

Spherical Roller	•	Taper Roller
Ball Radial	•	Ball Thrust
Roller Radial	•	Roller Thrust



What are the important things to **KNOW** about a metal-cutting Hack Saw Blade?

SELECTION ... the proper blade with the correct number of teeth, for cutting a certain type and shape of metal.

USE ... how to place the blade in the frame so as to avoid undue strain ... the speed of stroke, and pressure on the work, gauged by the hardness of the metal being cut and by the angle from which the cut must be made.

CARE ... how to protect the blade when not in use ... keep in box, or hang on nail out of way of possible damage from careless handling.



All these points, and many more just as important, are discussed in detail, with appropriate illustrations, in the pocket-size instruction manual "Metal Cutting." Use the coupon below to get your copy. It's FREE.

VICTOR SAW WORKS INC.
MIDDLETOWN, N. Y.

Makers of hand and power hack saw blades, frames, and metal cutting band saw blades.

VICTOR HACK SAW BLADES

VICTOR SAW WORKS, INC.
Middletown, N. Y.

Please send me a copy of your booklet "Metal Cutting."

Name _____

Address _____

Kind of work _____

NEWS OF INDUSTRY

Data Now Available On Minerals Detectors

New York

• • • Thirty-seven reports on magnetic airborne submarine detectors, including the magnetometer found useful in peacetime for aerial prospecting for minerals and oil, are now on sale by the Office of Technical Services, Dept. of Commerce.

Several types of magnetic detector equipment were developed during the war for tracking submarines from aircraft flying over the water. One type (AN/ASQ-3A), with minor modifications, has been used successfully for preliminary exploration in the far North and other inaccessible territories in search of hidden mineral deposits. It also permits the exploration of extensive areas of Alaska and offshore in the Gulf of Mexico in a search for possible new sources of oil, according to the Navy Dept.

AN/ASQ-3A was developed jointly by the Navy Ordnance laboratory under the auspices of the Bureau of Aeronautics and Bureau of Ordnance and the Bell

Telephone Laboratories.

Orders for these reports should be addressed to the Office of Technical Services, Dept. of Commerce, Washington 25, and should be accompanied by check or money order, payable to the Treasurer of the United States. The AN/ASQ-3A report in seven pages (PB No. 27323) is available in photostat or microfilm for \$1.

Hanna Net Advances

Cleveland

• • • The M. A. Hanna Co. reports consolidated net profit of \$2,231,393 for 6 months ended June 30, 1946, after all charges, including depreciation and depletion and provisions for federal taxes. The profit is equal after preferred dividends to \$1.97 a share on the 1,030,464 common shares outstanding.

In the corresponding period of 1945 net profit amounted to \$1,999,053, or \$1.76 a share on the 1,016,961 shares then outstanding.

Net profit for 3 months ended June 30, 1946, was \$1,210,922, equal to \$1.08 a common share, comparing with \$1,152,056 or \$1.03 a share, for the second quarter of 1945.

Data on 1944 Distribution of Canadian Steel

Ottawa

• • • The final analysis of the 1944 reports from manufacturers of iron and steel and their products in Canada shows gross production valued at \$2,540,992,974 at factory prices which is 1.3 pct below the \$2,575,976,547 reported for the corresponding figure in 1943. In the year under review 2192 factories operated in this group against 2044 in the year immediately preceding. These plants employed a monthly average of 411,944 people who were paid \$818,452,454 compared with 435,744 employees who received \$833,383,684 in 1943. Materials used in manufacturing processes cost \$1,104,083,922 against \$1,131,858,008 in the year 1943. The following table presents products produced, the number of operating plants and the gross selling value of products at work for the year 1944:

Industry	Number of Plants	Gross Selling Value of Products at Plants
Pig iron, ferroalloys, steel and rolled products	64	\$212,509,681
Iron castings	196	73,967,421
Heating and cooking apparatus	71	27,154,079
Boilers, tanks and plate work	37	32,287,172
Farm implements	29	61,098,793
Machinery	258	147,519,776
Automobiles	5	324,080,755
Bicycles	8	2,964,189
Automobile parts	114	160,195,380
Aircraft and parts	45	429,981,558
Shipbuilding	94	329,299,643
Railway rolling stock and parts	37	167,806,607
Wire and wire goods	81	41,609,836
Sheet metal products	194	109,928,858
Hardware, cutlery and tools	212	76,860,180
Bridge and structural steel	22	58,409,746
Machine shops	522	29,922,000
Miscellaneous iron and steel	170	256,407,290
Total	2,192	\$2,540,992,974

Price Range of \$474 A Ton Upsets World's Scrambled Tin Market

London

••• Tin price differentials in the world market are the subject of a vociferous complaint lodged by the Tin Producers' Assn. in its official monthly bulletin *Tin*. The existence of five United Kingdom prices and about four United States prices, in addition to separate price ranges in Europe and South America, is the main subject of the article. Excerpts from this outline, which represents the official tin producers' position on the tin price question, follow:

"Although the tin prices ruling on the London Metal Exchange differed from those in New York, such was the importance of London as a financial and commercial center that the London price of tin was generally accepted as the world price.

"In 1941, when enemy occupation of Malaya and the Netherlands East Indies deprived us of the world's most important source of tin supplies, dealings on the London market were suspended and the British Ministry of Supply through the Nonferrous Metals Control established a sale price for the British Government's tin of \$979 per ton, delivered consumer's works. On Jan. 1, 1944, this price was raised to \$1068 per ton.

"These changes in price were duly recorded in our statistics and graphs and until recently were accepted as the ruling world price for tin.

"It became evident many months ago that \$1068 a ton could in no way be accepted as a world price, and when the Ministry of Supply established a so-called export price for tin the matter was further complicated.

"In May this year we were forced to adjust our statistics in order to describe the price of tin, previously accepted as a world

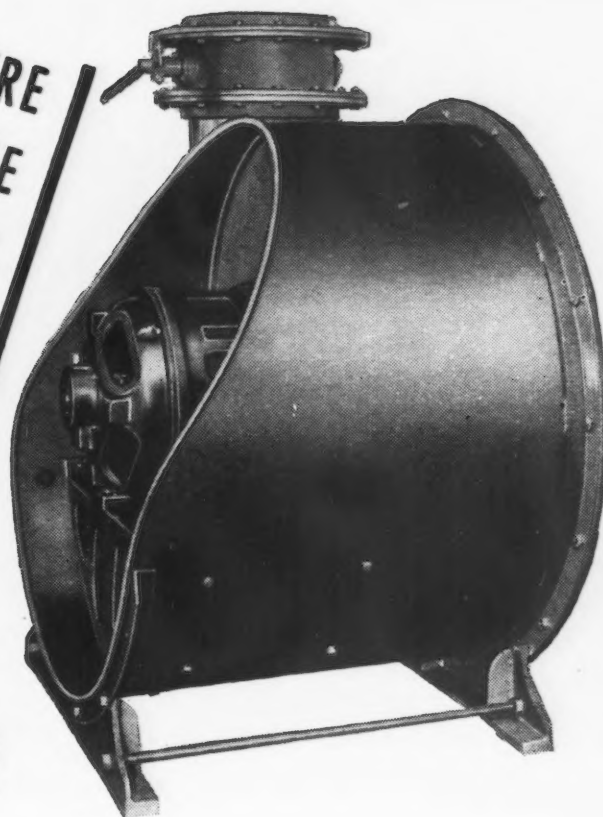
For observations on the accuracy of U. S. tin prices quoted see THE IRON AGE issue of July 4, 1946, p. 124.

price, as the 'U. K. domestic selling price,' and to add to our graph the 'U. K. export price.'

"Today there is no world price for tin; there is not even a London

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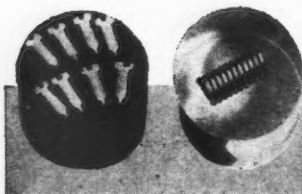
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NEWS OF INDUSTRY

price and a New York price. In actual fact there are now approximately a dozen different prices for tin, of which the following is the most up-to-date list:

U. K. Prices	Per ton	Cents per lb
Buying, Malayan tin.....	\$1068.00	54
Buying, S. African tin.....	1502.32	76
Buying, Bolivian tin.....	1228.20	62
Export.....	1170.92	64.2
Domestic.....	1068.00	54
U. S. Prices		
Buying, Bolivian tin.....	1187.26	60
Buying, Belgian Congo tin.....	1087.58	55
Export.....	1147.03	58
Domestic.....	1028.48	52
Other Prices		
Canada, domestic.....	1142.04	57.75
S. America, domestic, (upwards of)	1384.84	70
Continent of Europe, domestic, (upwards of).....	1345.68	68

"Ignoring the discrepancy of port, freight and smelting charges, these prices give an average of \$1326.84 per ton, but this can in no way be accepted as a world price. It bears no relation to fact, and depends on the whims and chances of bargaining and the decisions of government agencies.

"But it serves to show how farcical the tin price situation has become, and how unfair such conditions are to both producers and consumers.

"The economic price of tin today is that which is required to draw supplies from the marginal or highest cost producer. This in the case of tin is Bolivia, and it would seem that the appropriate price is in the neighborhood of \$1335 per ton.

"At the present time both London and Washington are maintaining artificial selling prices well below these figures, and since their buying prices are in most cases very much higher than the selling prices, it means in fact that both the United Kingdom and the United States taxpayers are subsidizing consumers of tin.

"It may be true that a percentage of present stocks being sold to domestic consumers in London at \$1068 per ton, and to domestic consumers in New York at 52¢ per lb were purchased at or around these figures, but the percentage must be small and they bear no relation to future buying.

"With the domestic buying price of tin in the U. S. still fixed at 52¢ per lb and buying prices between 55¢ and 60¢ per lb, exclusive of smelting costs at the Texas smelter, it is evident that dealing in tin is costing the U. S. government large sums of money each year.

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Bolivian contract American Government agencies are now paying 58½¢ per lb plus 1½¢, i.e. 60¢ per lb, for the period ended June 30, 1946 (equivalent of \$1187.26 per ton) for Bolivian concentrates. For Belgian Congo tin and tin concentrates they are believed to be paying (though it has never been officially announced) about 55¢ per lb f.a.s. West Africa port.

"Negotiations are at present being conducted between the Bolivian Tin Committee and the U. S. Reconstruction Finance Corp., and it is understood that the Bolivian producers are seeking to obtain a price of 66¢ per lb (equivalent to \$1217.52 per ton) retroactive to Jan. 1, 1946.

"It was reported from America recently that the Reconstruction Finance Corp. had offered the independent Bolivian producers 62½¢ per lb f.o.b. South American ports for all concentrates shipped during the period April-December 1946 inclusive. In an attempt to encourage increased production the corporation had also offered to pay a bonus of 1¢ per lb if shipments to Texas City during this period showed an increase of 15 pct over the quantities supplied in 1943-44.

"Latest advices indicate that a deadlock has been reached in the negotiations and that the independent producers are holding out for 65¢ per lb. Meanwhile, when the present agreement expires on June 30, sales will probably continue on a day to day basis at the current price of 60¢ per lb.

"Probable prices for a further contract with the Belgian Congo are unknown, but in view of the fact that the sales of Belgian tin are now extended to the liberated countries of Europe it is unlikely that the Belgians would be willing to extend the contract on the same terms. While the U. S. has recently raised its export price to 58¢ per lb (equivalent of \$1147.03 per ton), the domestic selling price of 52¢ remains the same.

"The price situation in the United Kingdom is as complex as it is in the United States. With the domestic selling price static at \$1068 per ton and the fixed export price recently reduced from \$1335 to \$1170.92, buying prices are entirely irrelevant.

"The British Ministry of Supply buying agency in Malaya is offering producers \$1068 per ton

NEWS OF INDUSTRY

for the first tin to come out of the Malayan mines since they were released from enemy occupation. Bolivian tin is being bought at \$1228.20 per ton.

"Negotiations have been continuing for some time between the Nigerian producers and the Ministry of Supply for the renewal of the bulk purchase contract which expired last December. The Ministry of Supply offered a new contract at the old price of \$1068 per ton f.a.s. Nigeria, but this was refused by the Nigerian Chamber of Mines. Negotiations are still proceeding and in the meantime deliveries are continuing on the understanding that any new agreement will be retroactive to the expiration date of the old contract.

"The maintenance of tin selling prices at a fixed maximum well below buying prices has been defended both in Great Britain and America on the grounds that an increase in selling price would disrupt the prices of other goods and help on the spiral of inflation.

"While this economic rule may be true of many commodities such as iron and steel, coal, foodstuffs, etc., it can have no possible truth as far as tin is concerned. Tin in its ultimate uses is employed in such small quantities that an advance of a few pounds sterling per ton would have no practical effect on the price of the final fabricated article.

"For instance, the biggest use of tin is in the production of tinplate, mainly for use in canning. Tinplate is roughly 98½ pct steel and 1½ pct tin, and it has been estimated that 1 lb of tin will plate sufficient steel to manufacture 300 cans. Thus, at \$1068 per ton, or 54¢ per lb, the cost of plating one can with tin is twenty-seven one hundred and fiftieths or 0.18 of a cent. Raising the price of tin to \$1246 per ton, or to 62¢ per lb, will mean that the cost of plating one can is raised to thirty-one one hundred and fiftieths of a cent—an additional cost of two seventy-fifths of a cent per can.

"Since tin is used almost entirely in small quantities on fabricated articles, the same thing can be proved in practically the whole field of tin uses, and a rise of even \$178 in the price per ton will have little or no effect on the price of the ultimate manufactured article. It is no defense therefore to main-



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NEWS OF INDUSTRY

tain that tin consumers must be subsidized in order to help stabilize the cost of living. The price of tin has no practical relation to the cost of living.

"Tin" maintains, as it has done for many months, that producers all over the world, and particularly in Malaya, where they have borne the heat and burden of the day during the war, should be paid a fair price for the tin they mine—a price in line with present day increases in costs and charges, and more clearly related to the general increase in the price of all commodities.

"In turn the selling price of tin should be put on an economic basis. The additional cost should be borne by the manufacturer who, by the small quantities he uses, will not be handicapped by the increase, and not by the taxpayer who, by having to shoulder the whole subsidy, carries the full burden.

"National expenditure at this time, over a year after the end of the war, is already high enough without piling on it additional and entirely unnecessary charges.

"We realize that unilateral action in regard to tin prices is difficult, but the matter is one of urgency and agreement should be reached between the producer and consumer countries for a price policy. The machinery, in the Allied Allocation Committee, exists in Washington at the present time and is representative of all the producing and large consuming countries of the world. The matter should not be delayed."

Bridgeport Brass Net Up

Bridgeport

• • • In a statement on earnings, Bridgeport Brass Co. reported for the second quarter of 1946, ended June 30, profits of \$724,874, after provision for federal taxes on income. This compares with profits of \$455,279 in the second quarter of 1945 and is equivalent, after preferred dividends, to 74¢ per common share as against 45¢ in 1945.

For the six months ended June 30, 1946, profits, after provision for federal taxes on income, amounted to \$467,040, equal to 44¢ per common share, which compares with \$972,563 for the first six months of last year, or 97¢ per common share.

Copper Imports And Domestic Mine Output Drop Sharply in 1945

Washington

• • • Following Germany's surrender, a report of the Bureau of Mines states copper deliveries of duty-free and duty-paid foreign copper for domestic consumption, as reported by the Copper Institute, dropped precipitously; they were 537,000 tons in the first quarter, 394,000 tons in the second, 259,000 tons in the third and recovered to 328,000 in the final quarter of 1945. The first quarter deliveries constituted a new high record by a substantial margin, the 218,488 tons for March having exceeded the prewar (1935-39) monthly average of nearly 57,000 tons by 283 pct. Only about one-third of the record March total was supplied from domestic sources, the remainder coming from Office of Metals Reserve stocks.

Despite the large demands for copper early in 1945 and the fact that proposed legislation, subsequently enacted into law in June, assured the continuation of bonus payments until June 30, 1946, a gradual reduction was taking place in supplies from domestic mines. Mine production aggregated 204,000 tons in the first quarter of 1945, 208,000 in the second, 184,000 in the third and 179,000 in the fourth. Production in the first quarter of 1945 was 24 pct below that in the first quarter of 1944, contrasted with the behavior of deliveries which were 40 pct higher in the first quarter of 1945 as compared with the similar period in 1944. Declining production in the face of record requirements is explained in large part by the continuing inability of government and operators to solve the problems imposed by the shortage of labor and the overall inefficiency of the labor available. The failure by a wide margin of domestic mines to supply total needs for copper in the late months of 1945, after hostilities ended, was a promising factor from a world viewpoint; the United States apparently would require metal from abroad to fill large pent-up civilian demand.

Most of the government's foreign purchase contracts were termi-

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nated effective Oct. 31. Before the end of the year, however, domestic production was lagging far behind consumption and government stocks were being depleted. In consequence of the inadequacy of United States production for current requirements CPA recommended the resumption of foreign purchases late in December and at the same time announced that the gap between production and reconversion requirements had widened to 46,000 tons. Announcement of the resumption was made Jan. 29, 1946, when RFC indicated that 20,000 tons a month for the first 6 months of 1946, or a total of 120,000 tons, would be bought abroad by the Office of Metals Reserve.

Imports of refined copper continued to establish new high records in 1945, a trend that began in 1941. Refined accounted for 62 pct of the total unmanufactured copper entered in 1945 and blister,

28 pct. In 1939 the respective tonnages were 5 and 73 pct.

Wire stood first in the export group again in 1945, having displaced refined copper in 1944; refined had dominated copper exports, usually by a very substantial margin since before 1900. The two products, as well as virtually

all others except rods, were shipped in smaller quantity in 1945 than in 1944.

Inventories of copper in virtually all hands gained in 1945 but fabricators indicated that the excess of booked orders over stocks, which had been declining since 1942, rose again in 1945.

The London Economist

(CONTINUED FROM PAGE 113)

sition to do so, with far-flung bases, the atomic bomb, mighty armed forces, and stand-by war industries. The isolationists have both a pacific and a militant wing, the latter shading off into the imperialist camp. None of the three likes its name.

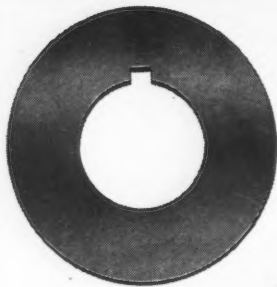
The isolationists have regional varieties, too. Midwest Republican Congressmen, from Ohio to the Dakotas and south to Missouri, are perhaps the most typical. They were among the last to realize the great danger their country and the

world faced in 1935-41, and were reluctantly internationalist in 1941-45, and are now reverting to pre-1941 moods. They are anti-British, anti-Russian, anti-foreign. They are willing to give the United Nations organization a try-out, so long as the United States is safeguarded by a veto power, but are indignant when another country uses the veto. They are even more isolationist economically than politically, and opposed the Reciprocal Trades Agreement Act in internationalist 1945 as well as the British loan in 1946.

In spite of their loudly proclaimed devotion to free private enterprise and competition, they regard competitive imports as an evil to be guarded against by prohibitive import duties, embargoes, and quotas. Many of them object to the continued presence of European possessions in the Western Hemisphere, but see no incompatibility in American requisition of bases on the far sides of the Pacific and Atlantic Oceans—nor in telling the Russians what they should do in Poland and the Balkans, and the British what they should do in Palestine, India and Siam.

The South, primarily because of its interest in world cotton markets, is the least isolationist region in the country. Yet it produces a few of the most vehement isolationists of all. Xenophobia is native to Southern society. Its white population is the most homogeneous in the country, its solidarity ever reinforced by horrified contemplation of the Negro minority which it oppresses and fears. (Negroes reach a majority in certain areas but no longer in any whole state.) There is less protectionism and less Anglophobia in Southern isolationism, and less indignation at the imperialism of others, but dislike and

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distrust of foreigners can reach fantastic degrees.

Eastern isolationism (and this applies to the part of the Midwest which is east of the Mississippi, too) is even more against imports and immigration than the isolationism farther Midwest. Where Irish or German stocks are strong, it is even more anti-British. In the East, some of both Democratic and Republican Congressmen may be isolationist, though commonly only a small minority of either. Most of the Republican internationalists (except for a few sports) are from the East, where banking and business have the international connections that make midwestern isolationists doubt their "Americanism."

Immigrant stocks are much less important as voting blocs than they were a generation ago, but they still retain some weight. A Scandinavian name is still a great asset in Minnesota or Nebraska, and an Irish or Italian name in a number of eastern cities. Irish and Jewish Anglophobia and Polish and Roman Catholic Russophobia are factors to be reckoned with in certain areas. The German and Scandinavian vote has lost much of its isolationist drive—German by passage of time since immigration and two wars against the ancestral country; Scandinavian by the revelation of 1940 that Scandinavian neutrality was not a matter of virtue and good management, but of good luck.

Public opinion polls show much less variation by regions than votes in Congress do. Congress is much more influenced by institutionalized opinion than by generalized public opinion. Organized Anglophobia has more weight than unorganized Anglophily. Trade associations demanding protective import duties have more weight than consumers wishing for cheaper goods, organized selfishness than unorganized altruism.

Public opinion sampling polls have long shown clearly that the public was willing to go back to rationing in order to prevent starvation abroad, but not even the relatively internationalist Administration dared try it. Sampling polls have shown that most Americans wanted to retain effective price control, but organized business did not, and Congress followed the latter. Sampling polls have

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shown that Americans are willing to have peacetime conscription, but Congress has contributed to the rapid break-up of ground and air forces by failing to act, either way, on the subject, merely extending the wartime conscription act in attenuated form for two periods of less than a year each. Most important of all, American voters go right on renominating and re-electing most of these same Congressmen and Senators on issues of police-pensions-in-Omaha, as if the world outside did not after all matter very much.

Yet as a hedge against the possibility that it may matter after all, even the discordant, quasi-isolationist Congress keeps the Navy strong, is lavish with funds for military and naval research and experiment, and is eager to make one more exception to the Atlantic Charter to allow the United States to keep far-off bases it took—or leased—in war. Three bills authorizing the government to help arm and train the armed forces of the new Philippine Republic, Latin American countries, and the na-

tional government of China, have been going smoothly through Congress with little opposition. Military aid to the Philippines is now law, and the other bills have been reported favorably out of the Foreign Affairs Committee in the House of Representatives.

Publicists as diverse as Walter Lippmann, William B. Ziff, John Foster Dulles, Brooks Atkinson, and William C. Bullitt are saying that the world is not one but at least two, and that our chief hope of peace lies in letting it fall into its "natural" regions. Messrs. Lippmann and Dulles want to supple-

ment this armed isolation by attempting to work with the Russians on matters of common interest in the border regions. This is not a bad description of what is actually happening.

But the American public has still not decided whether its "natural" region goes from Pearl Harbor to Boston; from Okinawa to Iceland; from "Perth, Australia, to Dover, England" (Mr. Ziff's prescription); or from Yunnan to Stettin. And very many Americans, especially the sort that vote in Republican primaries in the Midwest, are weary of thinking about such things.

Weekly Gallup Polls

(CONTINUED FROM PAGE 107)

the manual worker and white collar groups. The nonunion vote today among those groups combined is 51 pct Democratic, 49 pct Republican.

Yet in any election it must be borne in mind that for one of the world's leading champions of democracy, the United States has a sur-

prisingly poor record of turnout on election days.

The voter turnout in America is lower than in any large democracy which has held an election recently. In this respect, the United States ranks far behind Australia, France, England and Canada, and even behind Italy, where the first democratic election after two decades of fascist control was held last month.

France and Italy lead the list in high voter turnout in elections during the past year, with 80 pct or more of the eligible voters participating. Britain and Canada rank next with 76 and 74 pct respectively.

In the United States, which brings up the rear, only just a little more than half of the adult citizens (55 pct) took the trouble to vote in the 1944 presidential election. Worse still is the record of the 1942 Congressional elections. Those elections, held less than a year after Pearl Harbor, determined the membership of a House of Representatives faced with probably the most pressing problems in all our history. Yet only one third of the country's adult citizen voters went to the polls.

Here is how the United States compares with other nations that have held elections recently. The figures, while taken from the best sources available are approximations.

Italy: Monarchy referendum (June)—eligible voters, 33,500,000; total vote cast, 29,935,000; per cent of eligible voters voting, 89.

France: Constitutional referendum (May)—eligible voters, 25,-



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000,000; total vote cast, 20,085,000; per cent of eligible voters voting, 80.

Constituent assembly (June)—eligible voters, 25,000,000; total vote cast, 20,323,000; per cent of eligible voters voting, 81.

Britain: General election (July, 1945)—eligible voters, 33,000,000; total vote cast, 24,982,000; per cent of eligible voters voting, 76.

Canada: General election (June, 1945)—eligible voters, 6,952,000; total vote cast, 5,155,000; per cent of eligible voters voting, 74.

U. S. A.: Presidential election (1944)—eligible voters, 88,100,000*; total vote cast, 48,000,000; per cent of eligible voters voting, 55.

Congressional election (1942)—eligible voters, 83,700,000*; total vote cast, 28,000,000; per cent of eligible voters voting, 33.

**Estimate by Census Bureau of total number of adult citizens.*

In Australia the voter turnout in the 1943 general election was over 90 pct. Voting in federal elections is compulsory in that country.

In the European democracies one reason for the high turnout may be that elections have been less frequent, and hence a novelty attracting more attention. England had not had a general election in 10 yr, and France no national election since the war started. Italy went without free elections under Mussolini.

The low voter turnout in the United States not only shows lack of public interest in government, but also has far-reaching political repercussions.

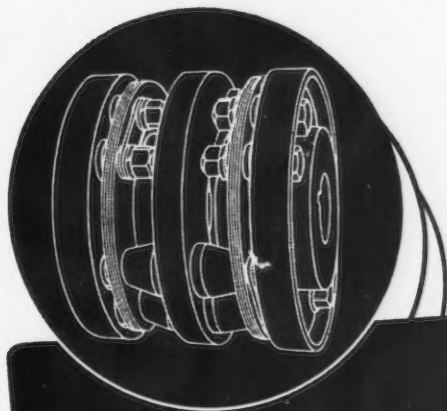
The people who stay at home on election day have, in the recent past, been mostly Democrats. The whole political picture might be changed if they turned out and voted in full strength. If the 1942 turnout had been normal, that is if the stay-at-homes had turned out in substantial numbers, there would have been no appreciable change in seats in the House and no gain in Republican seats.

There are several reasons for low turnout besides apathy. In general, voters have to go to more trouble to vote in this country than in Britain, France or Canada. Here many states and communities make no arrangements for permanent registration, but require voter to regis-

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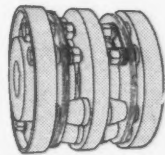
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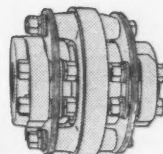
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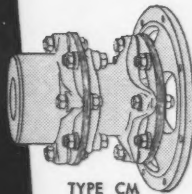
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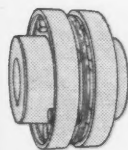
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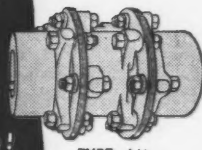
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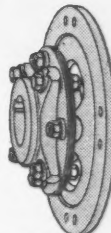
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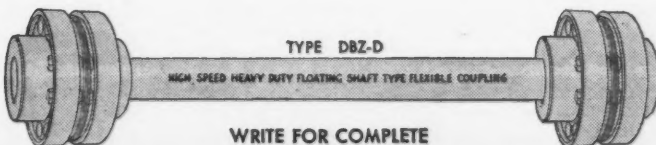
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ter each time there is an election.

Nonvoting is high in the South, where most Negroes and a substantial number of whites are discouraged from voting by poll taxes and local customs. However, the South is not alone responsible for the low total figure on voting in the United States. Even with the South excluded, the rest of the country shows a poor voter turnout.

Ford Plans \$10 Million Foundry Improvement

Detroit

• • • During the recent shutdown 11 projects were undertaken as part of a \$10 million postwar improvement program in the production foundry of Ford Motor Co.

Some of the projects included in the modernization program are as follows:

Cylinder block preliminary cleaning after cooling. Cost, \$268,000.

Cylinder block shot blast units. Cost, \$374,000.

Cylinder block chipping modernization. Cost, \$209,169.

Flywheel and transmission case molding system. Cost, \$100,000.

New cylinder head molding installation. Cost, \$104,000.

Valve and valve inserts melting and molding on M-2 system. Cost, \$118,000.

Rebuilding of M-1 molding system. Cost, \$199,400.

Installation of magnet-type charging cranes. Cost, \$90,000.

Additions to ventilation and fresh air systems. Cost, \$64,000.

Rebuilding of crankshaft core ovens. Cost, \$107,800.

Rebuilding of flywheel and transmission case molding system. Cost, \$100,000.

One of the major projects undertaken is the modernization of the area in which the preliminary cleaning of cylinder block takes place. New knockout and crack-off layouts have been installed and the sand and scrap will no longer pass through obsolete reclaim stations, but will be removed to dumping grounds through a modern disposal system which has been installed on the foundry roof.

The modernization program has as its objective providing more room in which to work a reduction of obnoxious heat, gas and dust throughout the foundry building.

Name Advisory Group To AFA Gray Iron Div.

Chicago

• • • Appointment of an advisory group to the Gray Iron Div. of the American Foundrymen's Assn. has been announced by T. E. Eagan, chief metallurgist, Cooper-Bessemer Corp., Grove City, Pa., chairman. Members of the new committee are:

A. L. Boegehold, head, metallurgical dept., Research Laboratories, Div., General Motors Corp., Detroit; John Bolton, metallurgist, Lunkenheimer Co., Cincinnati; H. Bornstein, director, testing and research laboratories, Deere & Co., Moline, Ill.; V. A. Crosby, metallurgical engineer, Climax Molybdenum Co., Detroit; R. F. Harrington, assistant works manager, Hunt-Spiller Mfg. Corp., Boston; Max Kuniansky, vice-president and general manager, Lynchburg Foundry Co., Lynchburg, Va.; C. H. Lorig, metallurgist, Battelle Memorial Institute, Columbus; J. T. MacKenzie, metallurgist, American Cast Iron Pipe Co., Birmingham; G. P. Phillips, chief metallurgist, automotive foundries, International Harvester Co., Chicago; F. G. Sefing, research metallurgist, International Nickel Co., Inc., New York; and E. K. Smith, consulting metallurgist, Beverly Hills, Calif.

Steel Casting Plant Sold

Washington

• • • War Assets Administration has announced the sale of a steel casting facility at Bettendorf, Iowa, operated during the war by the Zimmerman Co., to the S & W Corp. for \$190,000. A production of 1200 tons a month of gray iron and steel castings is forecast by the new owners.

Sale of the castings property leaves only one of the three Bettendorf surplus war plants for disposal (THE IRON AGE, July 18, p. 106). The Quad Cities Tank Arsenal was sold on June 25 to J. I. Case Co. for the sum of \$1,123,000.

The remaining plant, the Ordinance Steel Foundry, was originally sold on Mar. 25 to American Steel Foundries for a price of \$1,290,000 subject, of course, to various provisions of the Surplus Property Act, including a review of the award by the Justice Dept. This award was disapproved by Justice on July 1.

"Toughest Steel Known" Spells Economy in the Toughest Conveyor Service

Many heavy duty handling operations impose drastic shock loads and severe abrasive wear on the chain, sprockets and buckets employed.

The toughness and abrasion resistance of austenitic manganese steel are qualities without which such equipment is unnecessarily costly to maintain.

The two most important requisites in elevator and conveyor chain — durability and freedom from breakdown — find their highest development in Amsco Manganese Steel Chain. Having

a test-bar tensile strength of 100,000 - 130,000 lbs. p.s.i. and a developed-in-service hardness to 550 Brinell, combined with a touch shock-resisting body-metal, manganese steel chain withstands for long periods abuse that quickly destroys ordinary chain.

Manganese steel sprockets, and idlers too, have an assured service life greater than those of ordinary metal. They add length of life to transmission chains through taking on a smooth polish in operation. In a typical application where gray iron sprockets had to be replaced every few months, Amsco sprockets showed very little wear after three years in service.

Elevator buckets, also, are subjected to severe abrasive action and shock stresses. Amsco Manganese Steel Buckets have effected substantial economies in abusive

applications. These buckets can be supplied in standard sizes, plain or punched.



C-534. Manganese steel elevator buckets can be supplied in all sizes in accordance with elevator manufacturers' specifications, plain or punched.

Ask for descriptive Bulletins 742-CN and 842-WS.



C-471. Amsco manganese steel driving sprockets for steel mill transfer table chain.



A-267. Specimen strand of Amsco manganese steel draw-bench chain for trip-dog attachment.

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